

ZS. 72

British Birds

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Editors

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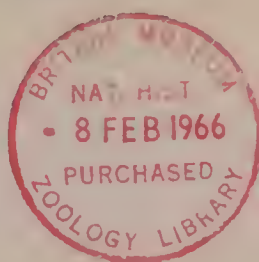
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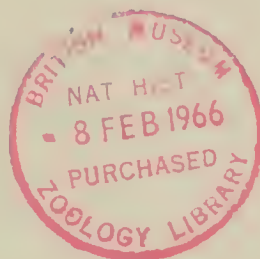
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FRONTISPIECE. Female Great Bustard *Otis tarda* on nest in oats, Portugal, May 1965, showing the grey head and sandy-rufous upper-parts boldly barred with black. Heat is making her pant and ruffle her feathers (pages 22-27) (photo: M. D. England)

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JANUARY 1966



An analysis of recoveries of Great Skuas ringed in Shetland

By *A. Landsborough Thomson*

MATERIAL

THE PURPOSE of this paper is to analyse the results of ringing chicks of the Great Skua *Catharacta skua* at its breeding colonies in the Shetland Islands, lying NNE of the mainland of Scotland. Up to and including 1964 a total of 5,628 Great Skuas had been marked there (or in a very few cases elsewhere) under the national scheme managed by the British Trust for Ornithology, using rings stamped 'British Museum (Natural History)' and with financial support from the Nature Conservancy. Up to 31st May 1965 (the approximate start of a new breeding season), this ringing had yielded 119 viable recovery records, which is at the rate of 2.1% (with some further records still to come from the younger birds—perhaps ten, which would bring the true recovery rate to 2.3%). Excluded from this total are 22 recoveries rejected because the birds had certainly or probably never flown (found dead at place of ringing after a short interval, or as remains after a longer one), and in one case because the distance travelled was negligible and no date could be assigned (skeleton only, found locally).

Although the records are not numerous, nearly all of them represent movement of some kind. Moreover, the data are homogeneous in that all the recovered birds were ringed as chicks, or pulli, and within a limited area (Shetland), so that they were of known age and virtually identical natal origin. The number ringed otherwise than as pulli has been negligible, and no recoveries have resulted.

Many of the individual records have already been published, with fuller details than need in every instance be repeated here, in the recovery lists and annual reports of the ringing scheme (Leach 1940, 1947, 1950; Spencer 1955 *et seq.*).

Table 1. Recoveries of Great Skuas *Calbaracta skua* ringed as pulli in Shetland, grouped by years of life and calendar months
Each entry represents a single record except where a number follows

Month	First year	Second year	Third year	Later years
June			N Scotland Greenland	off Faeroe (4th year) Faeroe (5th year)
July		W France	N Scotland Greenland (4)	Shetland (2) (4th year) Shetland (6th year) Shetland (7th year)
August	Local	W France	Greenland	E England (5th year)
September	E Scotland E England (4) S Norway NW Germany Netherlands (3) (Total 18)	Belgium (2) N France (3) Minsk, U.S.S.R. Outer Hebrides NW Spain (Total 18)		
October	Orkney (2) NE Scotland (2) E England (2) Denmark (3) NW Germany (3) Netherlands (7) N France (5) (Total 31)	Poland Saxony, Germany Austria (2) N Ireland W France NW Spain (Total 31)	N Scotland	

Month	First year		Second year	Third year	Later years
November	Orkney Denmark Netherlands S England N France (2) NW Germany S France NW Spain Portugal (5) (Total 14)		S France <i>off</i> W France E Spain Newfoundland		
December	Denmark (2) N France (2) <i>off</i> W Ireland W France N Spain (2) Portugal (2) (Total 10)			N Spain	
January	Belgium N France N Spain (2) Portugal (3) (Total 7)		N Spain (2)	W France N Spain	N Spain (4th year)
February	Massachusetts, U.S.A.			Greenland	
March			E England		
April				W France	
May	NW Spain		W France (2) Tunisia		

BACKGROUND

As is well known, this is a bipolar species and its sole Northern Hemisphere subspecies *C. s. skua* has a breeding distribution restricted to northern Scotland (mainly Shetland and other isles), the Faeroe Islands, Iceland and possibly Greenland. To these localities it is a summer visitor. Non-breeding birds range in summer over the North Atlantic from about 70° N south to about 40° N on the eastern side and 45° N on the western. In winter the range is roughly the North Atlantic between 60° N and 30° N. Occurrences outside these limits are casual, and seldom inland. The movements are normally purely maritime—sometimes coastal, sometimes pelagic.

INCIDENCE OF RECOVERIES

In all analyses of ringing data the seasonal and geographical incidence of recovery records may be heavily biased by factors that can hardly be evaluated statistically—differences in mortality itself, and differences in the circumstances that determine whether a casualty to a ringed bird is likely to be reported. In the present instance one is dealing with a largely pelagic species, and it has to be kept in mind that parts of the range will be very inadequately represented, if at all, in the ringing data. Further, the species is protected at its Scottish breeding places, so that apart from infant mortality there will be few records from there. It is relevant that the percentage of ringed individuals recovered is low for a large bird.

As already stated, all the ones recovered were ringed at what may be termed 'zero age'. The recoveries can be grouped by years of life, standardised as running from June to May inclusively (the earliest chicks being hatched in June). On this basis the figures are:

First	Second	Third	Fourth	Fifth	Sixth	Seventh
83	14	14	4	2	1	1

Most of those recovered were ringed on the islands of Unst (at Hermaness), Noss and Foula, the few exceptions being on Hascosay, Mousa and outlying Fair Isle. It seems reasonable to treat all as belonging to a single population.

Table 1 shows the recovery localities, arranged by years of life and calendar months.

FIRST-YEAR RECOVERIES

In the case of recoveries during the first year of life the immediate point of departure is known, whereas in subsequent years there is no means of saying from what summer area the winter movement of a particular bird may have originated. It can be presumed that Great

Skuas return to the natal area for breeding; but this may not occur until they are at least three years old (so far as age of maturity can be inferred from the imperfectly known sequence of plumages), and by then the number of records is tailing off.

The recovered birds were all ringed before they could fly, nearly all in July with very few in June or August; the sole viable recovery record for August is local. In September and October most of the records are from the eastern seaboard of Great Britain (from Orkney to Norfolk), from the opposite coasts of the North Sea (in an arc from southern Norway to Belgium) and from the English Channel (French coast). There are also some records from far inland in continental Europe (the furthest being from Minsk, U.S.S.R.)—mostly in one particular calendar year, as will be noted later. There are two records from the western side of the British Isles (Outer Hebrides and Northern Ireland), and three from the Atlantic coast of continental Europe (France, Spain, and Portugal); one of these last had reached north-west Spain as early as 4th September. The only record of a foreign-ringed Great Skua seems to be that of a pullus ringed at Öraefi, Iceland, on 27th July 1963 and recovered on Lough Corrib, Galway, western Ireland, on 23rd September in the same year (Hudson 1964).

In November, December and January, records from the northern areas are substantially fewer, and apparently diminishing. On the other hand, records from the Atlantic seaboard of continental Europe are much more numerous, as can be seen in tables 1 and 2. One was recovered at sea in December off the west coast of Ireland (*c.* 52° 45' N, 12° 00' W). The picture to this date may seem reasonably clear, so far as it extends, but there are general grounds for suspecting a direct westward 'leak' to the open waters of the North Atlantic; and at this the ringing data do no more than hint.

Table 2. Summary of first-year recoveries of Great Skuas *Catharacta skua* ringed in Shetland

A local record in August is omitted

	North Sea coasts	Channel coasts	Continent far inland	West of British Isles	Biscay to Portugal	North America
September	12	3	1	1	1	—
October	19	5	4	1	2	—
November	4	3	1	—	6	—
December	2	2	—	1	5	—
January	1	1	—	—	5	—
February	—	—	—	—	—	1
March	—	—	—	—	—	—
April	—	—	—	—	—	—
May	—	—	—	—	1	—

The sole record for February is a transatlantic one, from the coast of Massachusetts. For March and April there are no records at all of birds of this age, and for May there is just a single record from Spain. This may in part reflect some easement in the rate of juvenile mortality and the reduction of the population at risk, but probably also an increasing tendency to a pelagic mode of life. There is no sign of any return towards the natal locality by individuals about one year old.

The figures for first-year Great Skuas are summarised in table 2; and see the maps on pages 10-11.

SECOND-YEAR RECOVERIES

The paucity of records for the final four months of the first year of life is followed by a very marked drop in the number of records in the second year, compared with the first as a whole. The total for the second year is only 17% of that for the first. This is a low figure compared with, for example, 32.5% and 41% found in earlier studies of the Gannet *Sula bassana* and the Sandwich Tern *Sterna sandvicensis* respectively (Thomson 1939, 1943). It is unlikely that this is due to an excessive first-year mortality on the part of a strong, swift, agile and aggressive species with a slow rate of reproduction. In all the circumstances, it seems more reasonable to suppose that the figures reflect a tendency, increasing with age, to a completely pelagic existence.

Of the recoveries in the second year of life, nine are from the Biscay-Portugal seaboard (coasts of west France, north and north-west Spain, and Portugal) and are spread throughout the year; three more are from the western Mediterranean (east Spain, south France, and Tunisia) and details of these are given in table 3. That the only Mediterranean records should fall in this year of life may well be fortuitous, as well as the fact that two of them were in November 1963 (the

Table 3. Mediterranean recoveries of Great Skuas *Catharacta skua* ringed in Shetland

Tables 3, 4 and 5 follow the usual conventions to indicate the circumstances of recovery: the ring number is printed in italics if the ring was returned; if the recovery date is unknown, the date of report is given within brackets; the symbols are explained in table 6

416234	pull.	7.7.62	Foula
	×	~.11.63	Ponteau-St. Pierre, <i>near</i> Martigues: 43° 23' N. 5° 07' E. (Bouches-du-Rhône) France
<i>AJ62533</i>	pull.	25.6.62	Noss
	+	4.11.63	Burriana: 39° 54' N. 0° 05' W. (Castellón) Spain
416103	pull.	1.8.61	Foula
	×	10.5.63	Gabès: 33° 52' N. 10° 06' E. Tunisia

RECOVERIES OF GREAT SKUAS

autumn in which unusual weather so greatly affected first-year birds). The total is completed by single records from east England in March (the only one even approaching the breeding area) and from Newfoundland in November.

THIRD-YEAR RECOVERIES

The records for the third year of life are as numerous as those for the second, but they show a different picture. There are single recoveries in north Scotland in June, July and October, suggesting some approach to the breeding area at the age of two years. There are again winter records from the Biscay area, and also one in April. Finally, there are no less than seven records from Greenland, all in summer except for one in February, and details of these are given in table 4.

It is remarkable that all the Greenland recoveries, six in summer and one in winter, should fall in this year of life (various calendar years); but more data are required to confirm that this is a definite tendency as compared with second-year birds.

Table 4. Transatlantic recoveries of Great Skuas *Catharacta skua* ringed in Shetland

401218	pull. ×	8.7.39 4.2.40	Hermaness Swampscott: 42° 22' N. 71° 02' W. (Massachusetts) U.S.A.
AJ73049	pull. /?/	16.7.62 (7.11.63)	Hermaness Bonavista Bay: c. 48° 55' N. 53° 10' W. Newfoundland
416089	pull. +	1.8.61 16.6.63	Foula Jakobshavn: 69° 10' N. 51° 00' W. W Greenland
409690	pull. ×	24.6.56 28.7.58	Fair Isle Julianehåb Fjord: c. 60° 45' N. 46° 00' W. SW Greenland
414396	pull. +	8.8.59 7.7.61	Foula Frederikshåb: 62° 05' N. 49° 30' W. SW Greenland
416293	pull. +	2.8.61 16.7.63	Foula Frederikshåb, SW Greenland
416180	pull. +	28.7.61 11.7.63	Foula Frederikshåb, SW Greenland
416162	pull. +	28.7.61 16.8.63	Foula Quiogé Island: 61° 56' N. 49° 49' W. off Frederikshåb, SW Greenland
416065	pull. +	28.7.61 26.2.64	Foula Narssaq: 61° 00' N. 46° 00' W. (Julianehåb) W Greenland

LATER RECOVERIES

The recoveries in the later years of life are few. There are two records from the Faeroe Islands in June, suggesting that there may be some interchange between the Shetland and Faeroese breeding populations. There are four records from Shetland itself in July, suggesting return to the natal area to breed from the age of approximately three years onwards; otherwise there is a single record from east England in August, and one from the Bay of Biscay in January (for years of life see table 1—the oldest individual recovered was about six years of age). Apart from a single record, there are thus no ringing data relating to movement away from the breeding area in the fourth and subsequent years of life.

DIFFERENCES BETWEEN CALENDAR YEARS

The foregoing analysis by years of life leaves out of account any differences between one calendar year and another. Some such differences are in fact apparent on examination of the recoveries of first-year Great Skuas. Apart from purely numerical differences, there appear to be some definite qualitative variations in the pattern of the records.

October and November 1963, especially the first half of the former

Table 5. Far inland recoveries of Great Skuas *Catharacta skua* ringed in Shetland
Although in different countries, the two localities at which 421465 was recovered on the same day are less than ten miles apart; the record is assigned to Austria in table 1

416585	pull. +	14.7.62 1.9.62	Foula <i>near</i> Cherven: 53° 41' N. 28° 30' E. (Minsk) U.S.S.R.
421268	pull. ()	27.7.63 2.10.63	Foula River Odra, <i>near</i> Glogów: 51° 40' N. 16° 06' E. (Zielona-Góra) Poland
421465	pull. v	6.8.63 10.10.63	Foula Jochenstein: 48° 31' N. 13° 43' E. (Nieder-Bayern) Germany
	×	10.10.63	River Danube, <i>at</i> Niederkappel: 48° 28' N. 13° 53' E. (Mühlviertel) Austria
421592	pull. ×	26.8.63 18.10.63	Foula Lake Constance (Bodensee), <i>at</i> Hard: 47° 29' N. 9° 42' E. (Vorarlberg) Austria
HW01345	pull. × A	8.7.64 mid-10.64	Hermaness, Unst Tauscha, <i>near</i> Wechselburg: 50° 55' N. 12° 44' E. (Sachsen) Germany
421209	pull. ×	26.7.63 9.11.63	Foula Aix-les-Bains: 45° 41' N. 5° 55' E. (Savoie) France

month, were notable for the number of recoveries on the continental coasts of the North Sea and English Channel (Denmark, north-west Germany, Netherlands, north France). Unusually many of the recovery localities were some distance (20-70 miles) inland from the coasts, the furthest from the sea being at Oss in Noord Brabant; there were four such records in October 1963, as against three in all other years together. In addition, there were the four exceptional records from far inland on the Continent to which Spencer (1964) has already drawn attention; details are given in table 5, from which it will be seen that there are only two comparable records for other calendar years. In all, the Great Skuas born in 1963 contributed a disproportionately large share to the total of first-year records from the North Sea coasts and inland localities, and a disproportionately small share to the total of first-year records from the Biscay-Portugal area (compare maps A and B).

The other notable point is that in the period 13th-22nd September 1939 birds of that year provided a large share (eight out of 15) of all the September recoveries of first-year individuals in any calendar year on the coasts of the North Sea and English Channel (Great Britain four, Belgium two, north-east France two; judging from experience with other species, it is improbable that war conditions were at that stage inhibiting reports of possible recoveries in Denmark and the Netherlands).

In both 1939 and 1963 the recovery rate of first-year Great Skuas was unusually high. The ringing of 373 in 1939 yielded 14 recoveries in the first year of life; the ringing of 997 in 1963 yielded 26. The more usual situation in recent years has been a ringing total of about 400-550 and four to six first-year recoveries; in 1962 ringing reached a record total of 1,080, but yielded only twelve first-year recoveries. The comparison between the two bumper ringing years, 1962 and 1963, is particularly instructive; the first-year recovery rate in the latter was more than double the figure for the former. One may at least conclude that the phenomena described in the two preceding paragraphs are not due to ringing on an unusually large scale in the particular years.

One naturally seeks a reason in unusual weather conditions, and some explanation on these lines can indeed be found; the following statements are based on an interpretation of the weather reports and maps for the relevant periods, kindly provided from the Meteorological Office (H. H. Lamb *in litt.*).

On 26th September 1963 gales were widespread and severe in Scotland. Shetland had a gust of 87 knots and a maximum wind speed over one hour of 58 knots, and Orkney a gust of 78 knots and a maximum hourly wind speed of 53 knots; all these speeds were the highest ever recorded (i.e. since about 1920) in September. By 27th September the

BRITISH BIRDS



RECOVERIES OF GREAT SKUAS



RECOVERIES IN THE FIRST YEAR OF LIFE OF GREAT SKUAS *Catharacta skua* RINGED AS PULLI IN SHETLAND

A circle indicates the ringing area, and each black spot approximately represents the locality of a recovery within the category of the particular map

(A) Recoveries in October and November in calendar years other than 1963. In addition, crosses show four peripheral September recoveries; those not given are all on the coasts of the North Sea or the English Channel

(B) Recoveries in October and November 1963 (there is only one recovery in September 1963, from north-west Germany)

(C) Recoveries in December and January (all calendar years—but the winter 1963-64 contributed only two of these recoveries, both in the English Channel in December)

Map A may be taken as representing the normal pattern of autumn recoveries, and Map B an exceptional one in a 'wreck' year. Map C represents the mid-winter pattern, the next phase after that shown in A. The only first-year recovery in February is transatlantic, and there has been none in March or April

gale-force winds had moved to the eastern half of the North Sea between Norway and the Netherlands and were WNW. Strong north-westerly winds continued on 28th September and, after a period of variable winds the next day, there were moderate north-westerly winds again on 30th September over the whole area. In October the winds were more variable, mainly from between west and north-west in the first five days and thereafter westerly until the middle of the

month. It seems probable that the great gale at the end of September was responsible for the unusual number and pattern of recovery records during the first half of October, with some effects showing even into November; there is a strong suggestion of a 'wreck' of young Great Skuas during that period.

There is observational evidence that sea-birds of other species were simultaneously affected. After describing the immediate effects of the great storm at the end of September 1963, Davis (1964) wrote that the first three weeks of October (during which 'unsettled westerly cyclonic weather continued') were 'outstanding for seabird activity'. Further, he cited a German correspondent to the effect that there were 'astonishing concentrations of seabirds in the Elbe estuary during the same three weeks', including various species of petrels, skuas and gulls.

September 1939 was a month of good weather in the British Isles, with some unusually high pressure centred over south-west Scotland. Conditions over the North Sea were anticyclonic or controlled by south-westerly winds during the first ten days; but from 11th September onwards, when a depression travelled east and slowed down, the winds were mostly northerly. Places on the east coasts of the British Isles reported northerly winds up to Beaufort force 6 on four days and up to Beaufort force 5 on three more days between 11th and 22nd September; the northerly winds must have been stronger over the central and eastern North Sea, probably just about gale force on four or five of these days. During this same ten-day period the winds were often westerly near Shetland and often north-easterly over the southern half of the North Sea and the English Channel. The period of very strong north winds almost coincides with that of the unusual September recovery records.

MANNER OF RECOVERY

The manner of recovery is a relevant consideration in the interpretation of ringing data; but obviously the facts do not reflect the pattern of mortality in the species as a whole, as there is a heavy bias

Table 6. Manner of recovery of Great Skuas *Catharacta skua* ringed in Shetland
The symbols shown are used also in tables 3, 4 and 5

v	caught or trapped, and released with ring ('controlled')	3
+	shot or otherwise killed by man	30
×	found dead or dying	52
×A	found long dead	6
()	caught or trapped alive and not released, or released but with ring removed	25
/?/	manner of recovery unknown	3
Total		119

in favour of casualties of the kinds likely to be reported. These facts are given in table 6, in accordance with the categories used in the annual reports of the ringing scheme.

Some of those in the second category were shot at sea; many of those in the third and fourth categories were, as one would expect, found on beaches; 17, mainly in the fifth category, were recorded as caught on fishing boats, through becoming entangled in the tackle, taking baited lines, and so on. Two ringed on Foula on the same day (2nd August 1963) were likewise caught on the same day (3rd September 1964), and apparently together, off the coast of Estremadura, Portugal.

CONCLUSIONS

Ringing of pulli of the Great Skua in the Shetland Islands yields a percentage of recoveries that is unusually low for so large a bird; there is also an unusually large drop in the number of recoveries in the second year of life, compared with the first. The reason is presumably that pelagic casualties are not represented; and there are obviously large gaps in the picture of migration that the recovery records indicate. There are practically no ringing data relating to the winter movements of Great Skuas in their fourth and subsequent years of life.

The general picture presented by the ringing data seems to be:

(1) A dispersal of birds of the year, in autumn and winter, through the North Sea and English Channel, with some occurrences far inland (mainly under stress of unusual weather conditions in particular years); into the Bay of Biscay and off the west coast of the Iberian Peninsula; and into, and eventually across, the North Atlantic Ocean.

(2) A largely pelagic existence in the North Atlantic, off Europe more than off North America, from the late winter in the first year of life and through the second and third years, with some penetration of the western Mediterranean (present evidence relating only to second year).

(3) A tendency in the summer of the third year of life, i.e. at around two years of age, to visit higher latitudes—in Greenland and the north of Scotland (no evidence at present of a corresponding tendency when one year old).

(4) A return to Shetland in the summer of the fourth and subsequent years of life, i.e. from approximately three years of age onwards, some reaching the Faeroe Islands (conceivably joining the breeding population there).

COMPARISON WITH ARCTIC SKUA

It is of interest to compare the records for the Great Skua with the corresponding data for the Arctic Skua *Stercorarius parasiticus*, but in the

latter case they are as yet too few for thorough analysis. The Arctic Skua, or Parasitic Jaeger in American usage, differs in being a unipolar and monotypic species, in having a wide breeding distribution in high northern latitudes, and in performing a transequatorial migration. The British breeding distribution is similar in being restricted to northern Scotland, mostly the islands. All the recoveries to be mentioned below are of birds ringed as pulli in the Shetland Islands, most of them on Fair Isle.

In the first place one may note the negative evidence that there are no recoveries, at any age, of Arctic Skuas in the period December-April, and only one in May (Brazil, as below); and that the only two recoveries in the second year of life were in the Southern Hemisphere. The number rises slightly thereafter, mainly because a few are recorded in the natal area in the period June-August from the third to the sixth year of life. In one instance an Arctic Skua ringed as a pullus on Fair Isle on 18th July 1956 was 'controlled' there as an adult female on 14th June 1960 in its fifth year and eventually found dead on the coast of Norfolk about 19th August 1964 in its ninth year.

As regards the movement of young Arctic Skuas of the year, these are on the wing earlier in the season than young Great Skuas and there is a wide dispersal in August. Before the end of that month there are records from as far to the east as west Denmark on 26th August 1962 and north Germany on 24th August 1961, the locality in the latter instance being in Mecklenburg, not far from Lübeck at the south-west corner of the Baltic Sea; and from as far south as north Spain on 26th August 1956 and Algiers in August 1960. At the beginning of the next month there is a record from $62^{\circ} 48' \text{ N}$ on the west coast of Norway on 2nd September 1961; the other September record is from Belgium. The only two October records are from east England and south Portugal; the two November ones are from Belgium and west Denmark. After that, nothing.

In the second year of life there are only an October record from Benguela, Angola ($12^{\circ} 34' \text{ S}$), and a May record from near Maceió, Alagoas, Brazil ($9^{\circ} 24' \text{ S}$).

In the third and subsequent years there are the local summer records already mentioned, and a few other summer or autumn records from elsewhere on the coasts of Europe. In addition, there is an August record in the third year from Atangmik, Godthåb District, west Greenland ($64^{\circ} 55' \text{ N}$, $52^{\circ} 00' \text{ W}$), and a November record in the fourth year from Mossâmedes, Angola ($15^{\circ} 10' \text{ S}$).

SUMMARY

An analysis is presented of 119 recovery records of Great Skuas *Catharacta skua* ringed as pulli in the Shetland Islands. Attention is drawn to the special difficulties

of interpreting ringing data where there are large gaps attributable to a pelagic mode of life. The numbers of recoveries in successive years of life (June to May) are shown.

The recovery localities are tabulated by years of life and calendar months (table 1); and the records are discussed by years of life separately. The distribution of first-year recoveries is summarised (table 2 and maps). Individual details are given for Mediterranean (table 3), transatlantic (table 4) and far inland recoveries (table 5).

Differences in certain calendar years in the pattern of recoveries of first-year birds are discussed (maps A and B). Departures from the normal, shown notably in the number of far inland records, are related to unusual weather conditions.

Frequency figures are given for the manner in which the birds were recovered (table 6).

For comparison, a brief account is given of the scantier data, under the British ringing scheme, on the Arctic Skua *Stercorarius parasiticus*.

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Some mutations of the Partridge and Red-legged Partridge

By J. S. Ash

TWO MAJOR ABERRATIONS occur in partridges in Britain—one in Red-legged Partridges *Alectoris rufa*, which is known as *ornata* (Soler 1906) and is very rare, and the other in Partridges *Perdix perdix*, which is known as *montana* (Brisson 1760) and was formerly widespread and not uncommon but is apparently now rare. Well-marked mutations of this type are of particular genetical interest, and very little is known about them, so that it may be of interest to outline the history of their occurrences and distribution. The subject has been discussed in some detail by Mayaud (1947), but his paper is not readily available and there is now some further information to add.

ALECTORIS RUFA, MUT. ORNATA

This mutant of the Red-legged Partridge has been described adequately elsewhere (Ash 1959, Bateson 1925, Lowe 1945, Mayaud 1947, etc.), but as these references will not be readily accessible to many readers it may be useful to repeat the description briefly here. It is characterised by a transposition of feather coloration, rather similar to that of the flanks, on to the mantle and wing-coverts, as well as having many other variegations of plumage, which in total produce a most beautiful effect. It is well named 'harlequin' by the French (Bureau 1907).

The whole top of the head is black flecked with white, but the nape feathers are fringed with buffish; the ear-coverts are black. An inconspicuous dark 'necklace' separates the off-white throat from the extensive dove-grey of the breast and there is a complete absence of the black and white streaking on the breast and sides of neck and breast which is characteristic of a normal Red-leg. The dove-grey of the breast extends on to the hind neck where the feathers are fringed with buffish. The mantle is closely barred with bands of creamy-white, dove-grey, pale buff, black and rufous, those of the lower back being less so and merging into a deep buff rump and rufous-tipped tail-coverts. The rest of the under-parts are paler buff than in normal birds, only the tail-coverts being more strongly marked. The wings, except for the primaries, also show the inter-mixture of colours found on the mantle; in fact, the whole of the upper-parts lack the uniform appearance of a normal bird.

The most recent example of this mutation in England has been reported by the present author (1959). At the time its identity was uncertain, but it is now recognised to be a typical English example of the *ornata* mutant. It was shot at Tewkesbury, Gloucestershire, on 18th October 1958 and presented to me by W. J. Healing. It was an adult (i.e. at least 16 months old) and proved to be a female on dissection. According to Lowe (1945) there are nine specimens in the British Museum (Natural History):

- (1) Male; No. 1904, 10-2-1; Overbury, Gloucestershire, 9.10.1903.
- (2) Adult male; No. 1923, 1-29-1; Norton Hall, Gloucestershire, 26.10.1922.
- (3) ?Female; No. 1923, 3-11-1; Kinver, near Stourbridge, Worcestershire.
- (4) Overbury, Worcestershire (*sic*), 15.9.1928.
- (5) Juvenile; No. 1923, 8-8-1; Pirton Court, Worcestershire, 21.9.1923.
- (6) Pirton Court, Worcestershire, 14.9.1930.
- (7) Otterbourne, near Winchester, Hampshire, 6.11.1943.
- (8) Presented by Messrs. Rowland Ward; no data.
- (9) From Cheltenham, Gloucestershire; no other data.

In an admittedly inexhaustive search of the literature, I have been unable to trace any other records, so the 1958 Tewkesbury record may be only the ninth or tenth recorded in Britain. From France, Mayaud

(1947) reported that a few *ornata* mutants occurred in the neighbourhood of Pardailhan (Hérault) from 1906 to 1909, and that two were obtained at an interval of three years and one was preserved. A further specimen in the Toulouse Museum is of unknown origin. In Spain, where this bird has been named 'Perdus canaris', there are the following records: (1) one obtained at Sant Llorence del Munt, Catalonia, and preserved in the Museum of the Real Societat de Cacadors in Barcelona (Soler 1904 stated that sportsmen had recorded this variety from the same area in preceding years); and (2) one killed near Valence in 1915 (de Sagarra 1915).

This mutant closely parallels the similar mutant *atricapilla* (Fatio 1904) in the closely allied Rock Partridge *A. graeca*. In addition, two other distinct and recurring aberrations are known in the Red-leg, *xanthopleura* (Vincelot 1872) and *atro-rufa* (de Soland 1861). The former was once numerous in Cholet, France, but now appears to have died out; *atro-rufa* was also a common mutant in the same department between 1846 and 1861, but it disappeared also, and the only other records are three from England (one in Essex in 1908, and single birds from one area of Kent in 1914 and 1915). Mayaud also described these in detail.

PERDIX PERDIX, MUT. MONTANA

Briefly, this mutant is characterised by the striking distribution of colour in the plumage. In the best-marked examples the whole head region and upper breast are more or less uniform reddish-brown, and most of the rest of the plumage is a rich dark mahogany colour, relieved here and there with a few buffish tips and mottlings; the general effect recalls a Red Grouse *Lagopus l. scoticus*. The one illustrated in *The Handbook* is a very poorly marked specimen. The Nottinghamshire bird recorded below is a good example of the extreme dark type; whereas the Staffordshire one, although basically very dark, has a rich profusion, particularly on the mantle, of black and white bars and median buff streaks, producing in all an extremely variegated appearance. This bird still retains most of its juvenile head and neck feathers, and it is interesting to see that these are coloured like those of a typical bird; the new feathers in this area are of *montana* type. This mutation was formerly widespread in Britain and in other parts of Europe, but would now appear to occur only rarely here. The two most recent examples I have seen and preserved are as follows:

(1) First winter male, Shelford, Nottinghamshire, 17.10.1957, presented by F. Butler-Smith.

(2) First winter female, Paynsley Hall Farm, near Draycott-in-the-Moors, Staffordshire, 17.9.1960, presented by P. T. Tellwright. Since this record Mr. Tellwright has informed me (*in litt.*, 29.10.63) that a further two similar birds were

shot in the same season (1960) and that another specimen was killed in the same locality on 19th October 1963.

Northumberland in particular has produced many *montana* variants in the past (Bolam 1912, Gill 1922), and Norfolk, Essex and south Scotland have provided fair numbers (Mayaud 1947). In France, Brisson (1760) obtained it from the mountains of Lorraine, and it was presumably because of this that he named it *montana*, but it is well-known from many other parts. Mayaud stated that the most recent record he had found in France was from Maine-et-Loire in 1935, and that it had been recorded from Belgium but only rarely from Switzerland.

Stresemann (1924), in a survey of the distribution of this mutant, stated that most examples came from Britain, although it occurred fairly frequently in France in the departments of Seine Inférieure, Fosgas, Allier, Rhône and Saône. He had no evidence of its occurrence in Spain, Italy, Switzerland, Baden, Württemberg or Bavaria, but quoted one record from Holland and several in Germany in the south and south-west (East Friesland, Westphalia, Westerwald, three localities in the Leipzig area, Thuringia Forest, Pomerania and two from Mark Brandenburg). He also mentioned at least three from Hungary, and referred to specimens shot in Austria in the Natural History Museum in Vienna; nothing was known about its occurrence in Russia or Poland.

I have been unable to trace any more recent records.

One other well marked mutant of the Partridge is the pale mutation *palustris* (Olphe-Gaillard, 1864). This has been recorded from Belgium, Germany, England and France (particularly in the north).

DISCUSSION

Although there is a considerable range in the degree of patterning and intensity of coloration in British partridges, the gene pattern controlling pigmentation would appear to be very stable. Colour mutants are not nearly so frequent as they are in, for example, House Sparrows *Passer domesticus* and Blackbirds *Turdus merula*, both of which species seem to produce a fairly high proportion of birds with aberrant plumage (for example, see Sage 1963).

Among the many thousands of freshly-killed Partridges and Red-legged Partridges I have examined in various parts of England in the past 15 years, there has been none which departed to any marked degree from the normal, apart from the mutants already listed. Of the two species, Red-legs are the more stable.

Genetically, all these mutations must be recessive, so that it would be only under conditions of complete isolation from typical birds that

speciation might develop. Mayaud (1947) has pointed out that it must be very rare for two similar mutants of one of these species to survive and pair together the following year. However, this is known to have occurred on more than one occasion in the case of *montana*, and probably in the case of *ornata*. Where it does occur, a latent reservoir of mutant genes is presumably built up, and manifests itself in the regular production of birds with aberrant plumage over a period of years in the same area. In this respect, attention is drawn to the concentration of *ornata* records along the Worcestershire/Gloucestershire border where, according to Mayaud, one brood contained three young which were probably all of this type; and all the known English records except the Winchester one are either from Worcestershire or from close to its borders. Similarly in France, records are concentrated in one area in Hérault; and in Spain, as reported by Soler (1904), sportsmen had noticed the mutant in the Sant Llorence del Munt region of Catalonia in previous years.

Mayaud has pointed out that *ornata* mutants vary slightly according to the region in which they occur. The British examples are characterised by having an admixture of black on the lower back, and the latest record (see above) conforms with this pattern.

Of *montana*, Bolam (1912) quoted some 40 records from Northumberland alone between 1863 and 1891, since when the mutant appears to have practically died out. These occurred in many localities throughout the county, but interesting localised occurrences include the following: 'nine of them killed at Cresswell between October 1863 and October 1869'; 'on 14th October 1884, Mr. H. A. Paynter shot a very pretty adult specimen at Shilbottle . . . and between that date and the beginning of 1897 . . . killed six other examples on the same ground . . .'; 'two others . . . were killed at Heiferlaw, near Alnwick, in 1885 or 1886 . . .'; 'in 1887, a whole covey of the variety appeared in September, at Barmoor Castle, the old ones both dark birds, the young in various stages of development . . .'; 'on 16th October, 1873, a young female was shot out of a covey of ten, all of the brown variety'; etc. To these records can be added one from France, quoted by Mayaud, of two *montana* killed from one covey in Seine-et-Oise, on 3rd November 1895; some other members of the covey, perhaps all, were similar. Several other similar examples were given by Streseman (1924) and Gill (1922).

Considerable efforts have been made by G. W. Temperley, who has provided me with much information, to trace records of *montana* in Northumberland since Bolam's last record in 1891. Chapman (1907), who knew the border counties intimately, wrote, 'There is, or was, in Northumberland a race of dark-brown partridges.' This seems to suggest that he had not met with it himself and knew little about it.

Gill (1914) recorded an adult male shot near Morpeth in 1911, and later (Gill 1920) he stated that 'this mutant seems to be incomparably more frequent in Northumberland than anywhere else' and 'such an outbreak occurred last year (1919)'. However, there is no published evidence to indicate that such an outbreak had occurred; in fact, the only record for that year is reported by Edward Miller (*in litt.*) of Bolton, Alnwick. He writes: 'The only record that I have in my notes was of one shot on September 27th, 1919 . . . in the Helm Wood, near Eshott. It was identified by E. L. Gill at the Hancock Museum.' Incidentally, Eshott is close to Cresswell (see above).

Further evidence that this mutant has disappeared from Northumberland is provided by Mr. Temperley, who did not receive any records during his 24 years (1932-56) as recorder for the county's Ornithological Reports, and from Stephen Cook, Deputy Curator to the Hancock Museum, Newcastle upon Tyne, who has never had a specimen of this mutant during his many years at this Museum. The following areas, from which statistics are available for a long period, all report that *montana* has not occurred this century: Tweedhill, Berwick-on-Tweed (C. H. Brackenbury); large estates on the borders (Duke of Roxburghe and Sir Alec Douglas-Home); Doxford, north-east Northumberland (Lord Runciman); Alnwick, central Northumberland (Mr. Beresford-Pierse, Agent for the Duke of Northumberland); Blagdon, south-east Northumberland (Viscount Ridley). It thus appears that there are only two certain records (1911 and 1919) from the county in the 72 years since Bolam's last occurrence in 1891.

It has already been stated that *montana* variants superficially resemble Red Grouse; it is thus rather surprising to learn that a not infrequent mutant of the Red Grouse resembles the Partridge (Wilson 1910)! This grouse mutant is characterised by a speckling or barring of the dark feathers with whitish or buffish, and in general appearance recalls the *ornata* mutant of the Red-leg. As in the mutants of Partridges and Red-legs, this grouse mutation occurs sporadically in localities far apart and there is always a marked similarity in the specimens examined.

With regard to some recurring varieties in the Anatidae, Harrison (1953) has shown that these are recessive mutations which tend to show a reversal towards the original stock-type. Some examples of this type of mutant are the result of gene recombination in inter-specific hybrids; but hybridisation is not essential, for this atavistic gene combination appears regularly without hybridisation at the species level. One is tempted to suggest that some of these partridge mutants are also showing a reversal towards the primitive type. Perhaps, in particular, the Red Grouse-like *montana* mutant of *Perdix* on the one hand and the *Perdix*-like speckled mutant of the Red Grouse on the other, suggest at least that there are close phylogenetic affinities between the species,

and possibly indicate that they are examples of what Harrison has called autophoric reverse mutations.

The Red-leg *ornata* mutation and the closely parallel *atricapilla* mutant of the Rock Partridge also indicate the close phylogenetic relationship between the species. However, although these particular mutants are of a recessive nature, there is no suggestion that they indicate any reversal to a common primitive ancestor.

From this brief discussion it can be seen that the whole question of mutations in birds is a rather fascinating one, and one that has some particular significance to the geneticist; it is still a very much neglected subject.

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SUMMARY

Two interesting mutants, *ornata* of the Red-legged Partridge *Alectoris rufa* and *montana* of the Partridge *Perdix perdix*, are described and their present and past distribution in western Europe is reviewed; several new records are added. Their genetical significance is discussed.

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Great Bustards in Portugal

By M. D. England

Photographs by M. D. England and A. N. H. Peach

(Frontispiece and plates 1-8)

ORNITHOLOGICALLY, Portugal is still one of the least explored countries in Europe and a visit to any part may be most rewarding. Nevertheless, until my experiences of the last few years, I would not have chosen to go there to study and photograph the Great Bustard *Otis tarda*. Indeed, Bannerman (1962: 41) commented: 'Mr. Eric Flower writes under date 19th September, 1960 that he would not put the whole population in Portugal at more than a couple of score'. After three visits totalling some sixteen weeks, however, I am glad to be able to say that my friend Eric Flower (who has given me the greatest possible help on each occasion) was being unduly conservative, and it might be difficult to find anywhere in Europe where the species is more easily seen, even though the total number in Portugal may not be very great.

I was shown several breeding areas on my first visit in 1963, but because every moment of my stay was devoted to searching for the Black-winged Kite *Elanus caeruleus* (*Brit. Birds*, 56: 444-452, plate 65-72), I only by chance saw three Great Bustards. The following year, while still concentrating on other things, I spent two days assessing the Great Bustard situation with a view to a further visit and I was shown five nests, parties of up to nine adults and two females with chicks. In late April 1965 I was therefore not altogether surprised

though very pleased, when on the first day of our visit we flushed a flock of 59 in this area. On another occasion 36 were seen together; once a large flock flew across a main road in front of our car; and several times large parties of males were seen feeding or sheltering from the sun.

Great Bustards are reported from many parts of Portugal, especially out of the nesting season, but the main breeding area falls within a semi-circle of radius 70 miles about the town of Elvas, near the Spanish border. The present position seems to merit greater optimism than either of the maps by Eric Flower and Dr. J. A. Valverde (Bannerman 1962: 43-44) would lead one to suppose, and Victor Reynolds, who has long lived near the centre of the breeding area, considers that numbers have seemed greater in recent years.

Although the actual breeding habitat may broadly be described as 'rolling plains', the terrain is of several different types. A majority of nests in most areas are in vast cornfields, but many are also in rough pasture, some in various types of low-growing crops other than cereals, some on land so barren and rough that there is little growing on it, and we were even shown nests in large olive groves, one actually in the shade of a small olive tree. Trees are, in fact, by no means shunned and, when not engaged in nesting duties or in feeding, the birds often congregate in the shade of large cork oaks and eucalyptus.

The nesting success must be very low indeed, at least in the parts of Portugal which we visited. Apart from the fact that these wary birds desert readily, the eggs are frequently taken for food or are 'cooked' by the full heat of the blazing sun when a female is kept off the nest by farm-workers or shepherds, while those in oats are often destroyed by the early harvest (those in wheat and barley stand a better chance). Of the five nests which we were shown on our first day in 1965, only one was known to hatch and that because of our intervention. The female in these photographs cracked both her eggs on a small projecting stone in the middle of the nest (plate 2b). Despite this and their becoming increasingly obviously 'addled', she continued to sit well until ants discovered them. She then began to lose interest, but two good eggs were hastily substituted from a nest which was about to be destroyed by the scythe. These she hatched successfully, mainly because we offered to buy the standing crop to stop it being cut, though in the event this proved to be unnecessary because of the co-operation of the land-owner.

I have no evidence at all of second layings. On the contrary, on several occasions odd females, which were either non-breeding birds or ones which had lost their nests, were seen during the period when most were sitting or tending young. By this time the males had flocked and had ceased to display.

Added to all this, the adults are much shot for sport and food; the mechanisation of farming is spreading, albeit not very fast; and toxic pesticides are being used as enthusiastically as a new toy. It is therefore surprising, and most gratifying, that so large a bird can still be found in Portugal in such numbers.

Most nests are a mere scrape in the ground (plate 2b), often nothing more than a flattish bare patch, and two which we saw had so little hollow that the eggs tended to roll away. On the other hand, one in fairly tall grass had a distinct cup and the eggs were well sheltered by overhanging grasses. The eggs which we saw varied very much both in size and colour but were, broadly speaking, various shades of olive with dark brown markings, as has frequently been recorded. A clutch of three is slightly less common than two in our experience: two of the first five nests had three; and one, probably two, of another five had three (one clutch had been smashed by a plough). In Portugal most eggs are laid about the middle of April, and the substituted eggs in the nest photographed hatched on 23rd May.

This mention of a number of Great Bustards' nests must not be taken to mean that they are easily found. On the contrary, it would be possible to go to the right place in Portugal many times without finding a nest, and even without seeing a female Great Bustard. The large number which we saw was the result of planning and a system of rewards for reported nests. One cannot, in fact, ruthlessly trample down acres of growing corn in the remote hope of flushing a sitting bird, and very few females (only one which we saw) can be watched back to the nest.

During the incubation period female Great Bustards are very wary. Most rise and slink silently from their eggs when the intruder is a considerable distance away, though some sit very tightly, especially if the nest is in well-grown corn or other thick cover, with the result that when they do leave they go in such a flurry of alarm that there is a grave risk of non-return.

The site chosen for photography (plate 2a) had a solitary tree at a distance of seventy or eighty feet, behind which a hide could be started. This was erected at half-height behind the tree in tall undergrowth and must have been virtually invisible to the bird. It was then carefully moved forward by stages, and the growing oats between it and the nest were slowly cut away. The very short moves forward were made only on alternate days. The screen of oats on the hide side of the nest was only very gradually thinned and, as can be seen, was never completely removed. No doubt this careful treatment was the cause of the bird's eventual 'tameness', which allowed such photographs as plate 2a to be taken by people standing in full view.

On our first few visits to move the hide we never saw the bird, but



PLATE I. Female Great Bustard *Otis tarda* standing up at nest before walking off into the oats as an intruder approaches, Portugal, May 1965. This shows the general shape, plumage and size of the female, who is smaller and slimmer than the male but still stands about thirty inches high (pages 22-27) (photo: M. D. England)



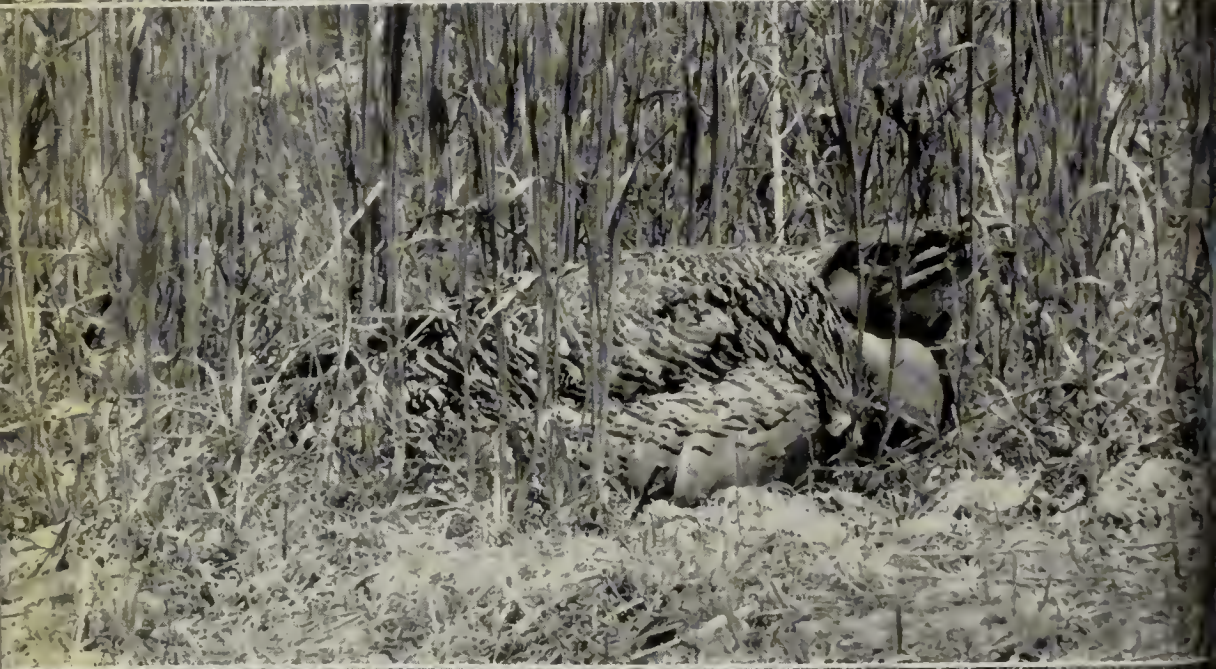
PLATE 2. Above, breeding habitat of Great Bustard *Otis tarda*, Portugal, May 1965, showing the hide from which the other photos were taken (the sitting female can be seen just beyond). Below, the nest scrape and two greenish eggs blotched with brown; the usual clutch is either two or three (page 24) (photos: M. D. England)





PLATE 3. Female Great Bustard *Otis tarda* at nest, Portugal, May 1965. Above, approaching the eggs with neck retracted and crouching walk. Below, alerted but not alarmed by a noise from the hide; she stretched up her head when suspicious, but crouched right down if danger threatened (see plate 4) (photos: M. D. England)







PLATES 4 and 5. Female Great Bustard *Otis tarda* on nest, Portugal, May 1965. Left, three studies in alertness: head low as someone approaches, then lower still, and finally right down when he reaches the hide. Above, plumage ruffled in breeze to keep cool. Below, settling down after turning the eggs (photos: A. N. H. Peach)







PLATES 6 and 7. Left, newly hatched chicks of Great Bustard *Otis tarda* at another nest, Portugal, May 1964, covered in sandy-buff down boldly marked with blackish-brown; note the egg tooth and large foot. Above, a fine study of the female panting in the heat with feathers ruffled to catch the slight breeze and showing the beautiful patterning to good advantage (page 25) (photos: M. D. England)



PLATE 8. Female Great Bustard *Otis tarda*, Portugal, May 1963, showing the effectiveness of her cryptic coloration: if one covers up the head

later she once or twice rose from about a hundred yards away and, after a short flight, landed to cluck agitatedly like an enormous domestic fowl.

The blazing sun was at once a menace and a help. We covered the eggs while we were working at the site, but every moment they were left uncovered afterwards was fraught with anxiety lest they suffer in the great heat. We were in no doubt that the hotter the day the more anxious she was to get back. This was particularly noticeable because, whereas at mid-day she would be incubating a few minutes after one's companions had retired, at the end of the afternoon when the shadows were lengthening she seemed in no great hurry to return. Even so, the eggs must have a remarkable tolerance of great heat, because, of course, there are occasions when they must be left exposed. While we were there the shade temperature frequently rose to 95° F. or more and conditions within the hide, which was in the full sun all day, necessitated the camera being enclosed in a 'cold compress' to prevent the metal parts from becoming jammed.

The bird approached the nest, with the utmost wariness and in complete silence, by a series of short zig-zag walks from the side away from the hide (plate 3a). So complete was her camouflage, so stealthy her movements and so long her pauses that one became aware of her presence a few feet behind the nest only because of her continuously pulsating throat. Even when she had practically no cover at all she was very difficult to see unless she raised her head (plate 8).

On the nest she was rather clumsy. She trampled down, or broke with her breast, the surrounding oat stems and more than once her efforts at turning the eggs (plate 5b) left one of them out beside her. As noted earlier, she eventually cracked both of them. Although at various times she was seen to sit facing in most directions, her favourite was with her back to the breeze, cooling herself by lifting her feathers (frontispiece and plates 5a and 7). In this position photography was nearly impossible when the breeze was at all strong, since fluttering feathers, pulsating throat and waving oats became one large movement.

She normally held her head fairly high, even while dozing with her eyes shut, but when suspicious she stretched it higher, only to drop it almost to the ground if danger became imminent, as when someone approached the hide (plate 4). Only once was she seen to stand when alarmed (plate 1) and then she looked remarkably like a watchful gander; this was when she heard the opening of the car door some three hundred yards away.

What little evidence we have suggests that the eggs hatch at roughly the same time, which is perhaps to be expected of a species in which the male apparently takes no part in incubation or rearing. A precocious two-day-old youngster would be an impossible responsibility for a

bird which dare not leave an unhatched egg for too long on a hot day. Certainly the two pairs of newly hatched young which we have examined closely have appeared to be of the same age (plate 6a). From the time of hatching, their feet and legs are noticeably large (plate 6b), although they are surprisingly weak at first and cannot run far without stumbling and resting. They have a faint mewling call, noted by Dr. Geoffrey Beven as being not unlike the distant mewling of a Buzzard *Buteo buteo*. At this time the female clucked like a domestic hen or sometimes made deep 'lowing' or 'moo-ing' notes. When disturbed from her eggs she had uttered guttural croaking or clucking noises. On one occasion (one day after the hatch) a watcher who entered the hide with apparently no hope whatever, because the nest was empty and neither parent nor chicks were visible, was delighted when, after ten minutes, the female walked on to the nest followed by the two tiny chicks.

The chestnut on the lower neck of the adult female is very variable; for example, the one in these photographs had almost as much as is usually shown in coloured illustrations of the male (frontispiece). The question of separating the sexes in the field has recently been discussed by Barbier and Stead (1965), but it seems worth adding that some females look very large when by themselves and that flocks of males of mixed ages may consist of birds of very different sizes, some indeed looking little more than half the size of the biggest when standing together. In late April or May solitary birds are *likely* to be females and gregarious ones are almost certainly males, though I have no proof that some of the smaller birds in these flocks are not immature females.

ACKNOWLEDGEMENTS

I have once again to express my thanks to Eric Flower and Victor Reynolds—both resident in Portugal—for their invaluable assistance. Since the latter lives in the midst of the Great Bustard country, he in particular gave help without which we might have achieved very little. He also most kindly lent us a Land Rover and it was due to his intercession that the cutting of the oats was delayed and the nest saved, so making photography possible. I am also very grateful to many land-owners, especially Snr. Joao de Noronha, who most kindly offered hospitality, and Snr. Jose de Matos Cortes, on whose land was the nest which we photographed; to Snr. Joao F. Flores Bugalho for a great deal of work in preparation for our visit; and, perhaps most of all, to Eng. Francisco Flores and his charming American-born wife, Dona Virginia, to whom nothing was too much trouble and who devoted themselves to smoothing out our difficulties. I must not omit my gratitude to Alan Tait of Oporto for introducing me to Joaquim

Inacio Saloio, whose capacity for collecting information on the whereabouts of Great Bustards and their nests is quite uncanny. Finally, all my party, most of whom had sessions in the hide, worked very hard as a team to bring about success and their observations have been incorporated in these notes.

SUMMARY

In the years 1963-65 the principal known nesting areas of the Great Bustard *Otisc tarda* in Portugal were visited. Flocks of up to 59 were watched and nests seen in a number of places and a variety of sites. The nesting distribution seems rather more extensive in Portugal than previously recorded and there is justification for hoping that numbers have recently increased or at least that previous estimates were pessimistic. One nest was watched and photographed from a hide almost daily for nearly three weeks.

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New Palearctic bird sound recordings in 1964-65

By Jeffery Boswall

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THE PURPOSE of this paper is to add another year to my discography of Palearctic bird sound recordings which listed all the relevant gramophone records known to have been published up to mid-1964 (Boswall 1964b). It reviews the additional records and tape-records which came to my notice between mid-1964 and mid-1965, except that I have excluded about 25 discs of captive birds, all issued before 1930, because they are of historical rather than ornithological import. It is envisaged that further summaries of this kind will be prepared from time to time and that these will not be dependent on any calendar period but will serve simply as a means of periodically keeping the original discography up to date.

The numbering of the discs follows on from the earlier paper and a cross-index of species, using these numbers, is provided. Particular attention may be drawn to Veprintsev 72, the first recordings of Siberian birds ever made; and to 80, Hans Traber's stereophonic disc, only the second to be published in Europe. The first 'tape-records' of

bird voice to be made commercially available anywhere in the world are those of Carl and Lise Weismann 70, published in October 1962. Close behind them, in June 1963, was Lawrence Shove with a tape version of his earlier record, 64 in the discography; the tape version is precisely the same as the disc and is available on a 3-inch diameter reel at either $7\frac{1}{2}$ i.p.s. twin track or $3\frac{1}{2}$ i.p.s. single track.

CORRECTIONS TO THE DISCOGRAPHY

A few corrections need to be made to dates of issue of the early discs:

- | | |
|----------------------------------|----------------------------------|
| 1. For '1908' read 'May 1910' | 5. For 'about 1927' read '1929' |
| 2. For 'before 1923' read '1914' | 9. For '1928' read '1929' |
| 4. For 'about 1927' read '1914' | 11. For 'about 1934' read '1931' |

Six other corrections: under 15, record 2B, for 'Wren' read 'Willow Warbler'; under 34, RFP 213, Black Woodpecker, for 'drumming and calls' read 'tapping and calls'; under 41, for 'the sixty-five species' read 'the eighty-eight species' (eighty-eight are in fact listed); on page 52 add '15' to 'Willow Warbler'; on page 56 for 'Taczanowski's Grasshopper Warbler' read 'Middendorff's Grasshopper Warbler'; and in the Introduction, page 2, ninth line from the bottom, for 'a recital of bird songs' read 'a recital of American bird songs'.

EUROPEAN SPECIES

On page 8 of the discography a list was given of 60 regular European nesters of which no European recording, published or not, was known to exist.

Remarkably enough, recordings of no less than 27 of these 60 came to my notice in the twelve months which followed. Roché has now published nine (see 75) and has in addition on tape: Cattle Egret *Bubulcus ibis*, Marbled Duck *Anas angustirostris* (captive), Ferruginous Duck *Aythya nyroca* (captive), Bonelli's Eagle *Hieraaetus fasciatus*, Purple Gallinule *Porphyrio porphyrio*, Audouin's Gull *Larus audouinii*, White-winged Black Tern *Cblidonias leucopterus*, Lesser Short-toed Lark *Calandrella rufescens*, Lesser Grey Shrike *Lanius minor* and Marmora's Warbler *Sylvia sarda*. Paatela (74) has published the song of the Little Bunting *Emberiza pusilla*. Sture Palmér of Sweden has tapes of Black-necked Grebe *Podiceps nigricollis*, Kite *Milvus milvus* and Purple Sandpiper *Calidris maritima*. Miss Susan Taylor has recorded Lesser Spotted Eagle *Aquila pomarina*, Cinereous Bunting *Emberiza cineracea*, Red-rumped Swallow *Hirundo daurica* and Eleonora's Falcon *Falco eleonora*.

ADDITIONS TO THE DISCOGRAPHY

70. WEISMANN, CARL and LISE (1962): *Birds*. Thirteen 4-inch diameter, $7\frac{1}{2}$ i.p.s. full track reels of tape, nos. 1-13. Obtainable from C. Weismann, Strodam, Hillerød, Denmark.

These are the first 'tape-records' of bird voice to be published in the Palearctic. They cover 73 bird voices and one amphibian.

REEL 1

Blackbird,* Song Thrush, Mistle Thrush, Redwing, Golden Oriole, Waxwing

REEL 2

Thrush Nightingale, Nightingale, Icterine Warbler, Swallow, House Martin, Dunnock

REEL 3

Great Tit, Blue Tit, Goldcrest, Tree-creeper, Wren

REEL 4

Chaffinch (Seeland), Chaffinch (Bornholm), Garden Warbler, Willow Warbler, Blackcap, Lesser Whitethroat

REEL 5

Marsh Warbler, Sedge Warbler, Reed Warbler, Reed Warbler and Marsh Frog *Rana ridibunda*, Grasshopper Warbler, Great Reed Warbler

REEL 6

Yellowhammer (Seeland), Yellowhammer (Bornholm), Corn Bunting, Reed Bunting, Greenfinch, Linnet

REEL 7

Skylark, Whitethroat, Wood Warbler, Chiffchaff, Redstart, Robin

REEL 8

Starling, Pied Flycatcher, Red-breasted Flycatcher, Tree Pipit, Wheatear, Whinchat

REEL 9

Nightjar, Tawny Owl (with young), Sparrowhawk, Hobby, Buzzard, Osprey

REEL 10

Quail, Cuckoo (both sexes), Wrenneck, Great Spotted Woodpecker, Woodpigeon, Pheasant

REEL 11

White Stork (with young), Black Stork, Heron (with young), Bittern, Lapwing, Redshank

REEL 12

Black-tailed Godwit (with young), Avocet, Oystercatcher, Great Crested Grebe, Coot, Moorhen

REEL 13

Raven (with young), Hooded Crow, Jackdaw, Jay, Magpie

71. ULRICH, HENRI (1964): *Oiseaux des Prés, Champs et Bois* and *Oiseaux du Marais*. Two 7-inch, 45 r.p.m. discs, nos. 250.016 PAF and 250.019 PAF. Pergola, Phillips-France, Paris.

Two successors to Ulrich's disc 60: 18 species of the fields and woods and 17 marshland birds.

250.016

A: Grasshopper Warbler, Yellowhammer, Whinchat, Meadow Pipit, Whitethroat, Lesser Whitethroat, Dunnock, Linnet, Partridge, Quail, Pheasant
B: Kestrel, White Stork, Hoopoe, Collared Dove, Bee-eater, Little Owl, Icterine Warbler

250.019

A: Bittern, Long-eared Owl (adult), Long-eared Owl (young), Scops Owl, Little Bittern, Bittern, Snipe, Reed Warbler, Mallard
B: Purple Heron, Night Heron (adult), Night Heron (young), Cetti's Warbler, Great Reed Warbler, Little Egret, Black-headed Gull with Herring Gull and Avocet, Herring Gull, Flamingo

72. VEPRINTSEV, B. N. and NAOOMOVA, ZAPISY R. (1964): *The Voices of Wild Nature: Siberian Birds*. One 10-inch, 33.3 r.p.m. disc, no. 14867-8. All-Union Studio of Disc Recording, Mezhdunarodnaja Kniga, 32/34 Smolensk Square, Moscow 200.

This exciting record presents the voices of 23 species recorded in

*Scientific names are given in the CROSS-INDEX OF SPECIES on page 34-36.

central Asia. So far as I am aware, seven of the species have not previously been recorded (those marked with an asterisk) and one—the Lanceolated Warbler—appears for the first time on a disc. This record provides the first opportunity for western ornithologists to hear the songs of, among others, the Thick-billed Warbler and Radde's Warbler. The inclusion of Pallas's Grasshopper Warbler means that, accepting *Locustella ochotensis* as a full species and not as a race of Pallas's (see Boswall 1964: 56), all seven species of the genus *Locustella*, a particularly interesting group of singers, are now recorded.

The record is the fourth in a most valuable series (see 46 in the earlier discography). The Novosti Press Agency bulletin no. 2894, dated 30th April 1965, announcing the issue of this record, says 'Some 100,000 discs have been sold so far in the series'.

A: White's Thrush, Siberian Blue Robin, Indian Tree Pipit, Mugimaki Flycatcher*, Rufous Turtle Dove, Rustic Bunting, Siberian Chiffchaff, Oriental Cuckoo, Nutcracker, Red-flanked Bluetail, Swinhoe's Pseudo-robin*

B: Siberian Rubythroat, Gray's Grasshopper Warbler, Chinese Bush Warbler*, Thick-billed Warbler*, Arctic Warbler, Brambling, Radde's Warbler*, Swinhoe's Snipe*, Goshawk, Carrion Crow, Lanceolated Warbler, Pallas' Grasshopper Warbler*

73. WAHLSTRÖM, STEN (1964): *Våra Svenska Fåglar i Ton*. Three 7-inch, 45 r.p.m. discs, nos. V Sr F 13-15. AB Svensk Litteratur, Stockholm 16.

These are the three supplementary discs referred to under 62 in the original discography; they give the vocalisations of twenty-seven species.

V SV F-13

A: Goshawk, Quail, Black-tailed Godwit, Caspian Tern **B:** Little Tern, Eagle Owl, Sand Martin, Jackdaw, Crested Tit

V SV F-14

A: Nuthatch, Dipper, Whinchat, Black Redstart **B:** Grasshopper Warbler,

River Warbler, Savi's Warbler, Marsh Warbler

V SV F-15

A: Greenish Warbler, Chiffchaff, Wood Warbler, Goldcrest **B:** Red-breasted Flycatcher, Goldfinch, Scrin, Corn Bunting, House Sparrow, Tree Sparrow

74. PAATELA, J. (1964): *Laulava Lintu Kirja*. Six 7-inch, 45 r.p.m. discs, and book (123 pages). Werner Söderström Osakeyhtiö, Porvoo, Helsinki, Finland.

Professor Paatela has prepared an attractive publication: packed with the discs in a box, and the same size as them, is a book with colour photographs. Eighty-four species may be heard, including the first recording known to me of a Little Bunting, and the second of the Yellow-breasted Bunting.

RECORD 1

A: Song Thrush, Robin, Wren, Chiffchaff, Willow Tit, Long-tailed Tit,

Nightjar **B:** Woodlark, Tree Pipit, Lesser Whitethroat, Woodpigeon, Black Grouse, Goshawk, Black Woodpecker

RECORD 2

A: Chaffinch, Willow Warbler, Wood Warbler, Greenish Warbler, Red-breasted Flycatcher, Golden Oriole, Cuckoo
B: Thrush, Nightingale, Blackcap, Garden Warbler, Barred Warbler, Redwing, Great Spotted Woodpecker, Lesser Spotted Woodpecker

RECORD 3

A: Starling, Wryneck, Pied Flycatcher, Redstart, Great Tit, White Wagtail
B: Starling, Greenfinch, Icterine Warbler, Blackbird, Fieldfare, Magpie

RECORD 4

A: Skylark, Yellowhammer, Ortolan Bunting, Whitethroat, Stonechat, Curlew, Corncrake
B: Blyth's Reed Warbler, Marsh Warbler, Grasshopper Warbler,

ler, River Warbler, Scarlet Grosbeak, Reed Bunting, Yellow-breasted Bunting

RECORD 5

A: Sedge Warbler, Reed Warbler, Great Reed Warbler, Water Rail, Bittern, Black-headed Gull, Little Gull
B: Common Sandpiper, Yellow Wagtail, Lapwing, Snipe, Spotted Crake, Red-necked Grebe, Mallard

RECORD 6

A: Turnstone, Ringed Plover, Redshank, Common Tern, Caspian Tern, Common Gull, Lesser Black-backed Gull, Herring Gull
B: Bluethroat, Brambling, Arctic Warbler, Little Bunting, Golden Plover, Bar-tailed Godwit, Greenshank, Spotted Redshank, Whooper Swan

75. ROCHÉ, JEAN-CLAUDE (1964-65): *Guide Sonore des Oiseaux d'Europe (Tome I, Oiseaux de France)*. Eleven 7-inch, 45 r.p.m. discs, nos. 6 and 10-19. Jean-Claude Roché, La Malière, Collobrières, (Var), France.

With creditable speed, the indefatigable Monsieur Roché is steadily bowling over the birds of Europe. Having produced eight discs (with 80 species) in 1964, by May 1965 he put on the market eleven more with 94 species. Of these, four are almost certainly first-ever recordings: Citril Finch, Snow Finch, Rock Partridge and Pallid Swift; and seven are of species whose voices are published for the first time: Alpine Accentor, Wallcreeper, Barbary Partridge, Crag Martin, White-backed Woodpecker, Pin-tailed Sandgrouse and Little Bustard.

6. *'Fringilles de Montagne'*

A: Serin, Citril Finch, Siskin, Redpoll
B: Crossbill, Bullfinch, Alpine Accentor, Snow Finch

10. *'Chouettes et Hiboux'*

A: Eagle Owl, Long-eared Owl, Scops Owl, Pygmy Owl, Little Owl
B: Tengmalm's Owl, Tawny Owl, Barn Owl, Short-eared Owl

11. *'Petits Grimpeurs, Roitelets, Cincle, Troglodyte'*

A: Firecrest, Goldcrest, Treecreeper, Short-toed Treecreeper
B: Wren, Dipper, Nuthatch, Wallcreeper

12. *'Gobemouches, Pipits et Bergeronnettes'*

A: Tawny Pipit, Water/Rock Pipit, Meadow Pipit, Tree Pipit, Spotted Flycatcher
B: Yellow Wagtail, White

Wagtail, Collared Flycatcher, Pied Flycatcher

13. *'Gallinaces'*

A: Quail, Partridge, Red-legged Partridge, Rock Partridge, Barbary Partridge
B: Pheasant, Hazel Hen, Black Grouse, Capercaillie, Ptarmigan

14. *'Hirondelles et Martinets'*

A: Swift, Pallid Swift, Alpine Swift, Starling
B: Crag Martin, Sand Martin, House Martin, Swallow

15. *'Pics et Torcol'*

A: Wryneck, Lesser Spotted Woodpecker, Great Spotted Woodpecker, White-backed Woodpecker, Middle Spotted Woodpecker
B: Three-toed Woodpecker, Green Woodpecker, Black Woodpecker, Grey-headed Woodpecker

BRITISH BIRDS

16. 'Coucou, Huppe, Martin-Pêcheur, etc.'

A: Kingfisher, Bee-eater, Roller, Nightjar **B:** Cuckoo, Great Spotted Cuckoo, Hoopoe, Pin-tailed Sandgrouse

17. 'Pigeons et Tourterelles, Foulque, Rales et Poule d'Eau'

A: Rock Dove, Stock Dove, Woodpigeon, Collared Dove, Turtle Dove **B:** Corncrake, Water Rail, Moorhen, Coot

18. 'Grands Limicoles'

A: Oystercatcher, Black-winged Stilt, Avocet, Pratincole, Little Bustard **B:** Lapwing, Black-tailed Godwit, Stone Curlew, Curlew

19. 'Petits Limicoles'

A: Common Sandpiper, Redshank, Snipe, Woodcock **B:** Kentish Plover, Little Ringed Plover, Ringed Plover

76. TRETZEL, ERWIN (1965): *Stimmen Einheimischer Vögel*. Two 7-inch, 45 r.p.m. discs, nos. 75-0964.5 and 75-0965.5. Kosmos, Pfizerstrasse 5-7, 7 Stuttgart 1, Germany.

Two further discs in the series started by C. Fentzloff and G. Thielcke and continued by Tretzel, 31 and 65 respectively in the earlier discography.

0964.5

A: Lapwing, Tree Sparrow, Corncrake, Water Rail **B:** Siskin, Magpie, Great Crested Grebe, Capercaillie

0965.5

A: Bluethroat, Spotted Flycatcher, Curlew, White Wagtail **B:** Red-backed Shrike, Swift, Linnet, Fieldfare

77. KIRBY, JOHN (1965): *Listen . . . the Birds!* Three 7-inch, 33.3 r.p.m. discs, nos. 10, 11 and 12. European Phono Club, Amsterdam. Obtainable from the Dutch Society for Bird Protection, Reguliersgracht 9, Amsterdam, and the Royal Society for the Protection of Birds, The Lodge, Sandy, Bedfordshire.

These three discs are successors to the same recordist's earlier three (57 in the discography). In view of the value of knowing where and when recordings were made, as a basis for regional and temporal comparisons, John Kirby has kindly supplied me with these details which are all too seldom given on published discs. The recordings were obtained in Argyll (A), Suffolk (S), Westmorland (W) or Yorkshire (Y) unless otherwise stated and between 1960 and 1964 in the months shown.

RECORD 10

A: Mallard (W, Nov), Gadwall (S, May), Shoveler (W, Apr), Teal (W, Nov; W, Apr; S, May) **B:** Pochard (S, May), Shelduck (S, May), Canada Goose (Y, Oct), Mute Swan (A, Jun), Whooper Swan (W, Oct/Nov), Little Grebe (Y, Mar), Red-throated Diver (Shetland, May)

RECORD 11

A: Red Grouse (Y, Mar), Black Grouse (Durham, Apr), Dunlin (Y, Sept),

Wheatear (Shetland, May; W, Aug), Stonechat (A, May) **B:** Ring Ouzel (Y, Apr), Spotted Flycatcher (Y, May), Pied Wagtail (A, Jun), Yellow Wagtail (Y, Aug), Grey Wagtail (A, May), Corncrake (Outer Hebrides, Jun)

RECORD 12

A: Swift (Y, Jul), House Martin (Y, Jul), Blue Tit (Y, Jun), Treecreeper (Y, Jun) **B:** Carrion Crow (Y, Apr), Rook (Y, Mar), Jackdaw (Y, Jul), Magpie (Y, Oct), Kittiwake (Northumberland, Jul), Sandwich Tern (Durham, Aug)

78. TESSON, ANDRÉ (1965): *Chants d'Amour en Forêt*. One 7-inch, 45 r.p.m. disc, no. LVB 4. 'La Vie des Bêtes', 49 Avenue Léna, Paris 16e.

The fourth in this series, the others being 49, 50 and 51.

A: Woodpigeon, Chiffchaff, Willow Warbler, Garden Warbler, Blackcap, Green Woodpecker, Golden Oriole

B: Turtle Dove, Great Spotted Woodpecker, Starling, Rook, Red Deer *Cervus elephus*, Fallow Deer *Dama dama*, Tawny Owl

79. ROCHÉ, JEAN-CLAUDE (1965): *Chant des Oiseaux*. One 7-inch, 45 r.p.m. disc, issued with eight bird whistles. Citröen, 133 Quai André Citröen, Paris.

This novelty was produced as a publicity give-away by the Citröen Car Company. Having practised on your pipes with recordings of the real thing as models, you are expected to drive into the country and, like the piper of Hamelin, lure into view Song Thrush, Red-legged Partridge, Blackbird, Curlew, Tawny Owl, Cuckoo, Wigeon or Skylark. The instructions are printed in French, English, Spanish, German and Italian.

80. TRABER, HANS A. (1965): *Singende Landschaft: Paysages qui Chantent*. One 7-inch, 45 r.p.m. stereophonic disc, no. SHT 30. Obtainable from Hans A. Traber, Frohburgstrasse 46, Zurich 6, Switzerland.

This is only the second European stereophonic disc of bird voices (see 63 in the earlier discography).

A(1) *Easter morning*: a Blackbird is whistling while a Woodpigeon coos in the background; in the foreground we hear a Robin; a Cuckoo calls and some Carrion Crows can be heard in the distance; five o'clock strikes and the Easter bells ring out (2) *Deciduous trees and conifers*: A Carrion Crow croaks in the background; a Fieldfare chatters and, further away, a Coal Tit sings, followed later by a Golderest; Fieldfares call in flight and a Willow Warbler sings in the foreground (3) *Spruce forests*: a Mistle Thrush dominates the scene; a Cuckoo is calling in the background and, further away, a Woodpigeon; a Fieldfare flies

off and then comes nearer in two stages, giving a sense of depth B(1) *Fields and meadows*: a cock is crowing in the background; two Skylarks sing in flight; we hear distant bells on grazing cattle and Carrion Crows croaking (2) *Waterside woods*: before sunrise two Cuckoos are vying with each other; a Nightingale sings in the foreground and a Golden Oriole is whistling; further away, we hear the song of an Icterine Warbler (3) *Early spring*: a Great Tit is calling close by and a Robin sings; a Great Spotted Woodpecker and a Grey-headed Woodpecker drum in several different places in the background.

81. ANON (1965): *Vogelstimmen: Singvögel unserer Heimat*. One 10-inch, 33.3 r.p.m. disc, no. 60812. Electrola, Germany.

A: Blackbird, Song Thrush, Robin, Great Tit, Blue Tit, Chaffinch, Greenfinch, Chiffchaff, Willow Warbler, Green Woodpecker, Blackcap, Garden Warbler, Great Spotted Woodpecker, Nightingale

B: Skylark, Meadow Pipit, Goldfinch, Whitethroat, Woodlark, Dunnock, Corn Bunting, Reed Warbler, Sedge Warbler, Marsh Warbler, Grasshopper Warbler, Reed Bunting, Moorhen, Coot

CROSS-INDEX OF SPECIES

217 birds, sound-production by which can be heard on the gramophone records 70 to 81, are listed below in systematic order based on Peterson *et al.* (in press). The vernacular and scientific names generally follow this same reference work or Vaurie (1959-64).

- Red-throated Diver *Gavia stellata*, 77
 Little Grebe *Podiceps ruficollis*, 77
 Great Crested Grebe *Podiceps cristatus*, 70, 76
 Bittern *Botaurus stellaris*, 70, 71, 74
 Little Bittern *Isobrychus minutus*, 71
 Night Heron *Nycticorax nycticorax*, 71
 Little Egret *Egretta garzetta*, 71
 Grey Heron *Ardea cinerea*, 70
 Purple Heron *Ardea purpurea*, 71
 White Stork *Ciconia ciconia*, 70, 71
 Black Stork *Ciconia nigra*, 70
 Flamingo *Phoenicopterus ruber*, 71
 Canada Goose *Branta canadensis*, 77
 Mute Swan *Cygnus olor*, 77
 Whooper Swan *Cygnus cygnus*, 77
 Shelduck *Tadorna tadorna*, 77
 Mallard *Anas platyrhynchos*, 71, 77
 Teal *Anas crecca*, 77
 Gadwall *Anas strepera*, 77
 Wigeon *Anas penelope*, 77, 79
 Shoveler *Anas clypeata*, 77
 Pochard *Aythya ferina*, 77
 Osprey *Pandion haliaetus*, 70
 Goshawk *Accipiter gentilis*, 72, 73, 74
 Sparrowhawk *Accipiter nisus*, 70
 Buzzard *Buteo buteo*, 70
 Hobby *Falco subbuteo*, 70
 Kestrel *Falco tinnunculus*, 71
 Red Grouse *Lagopus lagopus scoticus*, 77
 Ptarmigan *Lagopus mutus*, 75
 Hazel Hen *Tetrastes bonasia*, 75
 Black Grouse *Lyrurus tetrix*, 74, 75, 76
 Capercaillie *Tetrao urogallus*, 75, 76
 Rock Partridge *Alectoris graeca*, 75
 Barbary Partridge *Alectoris barbara*, 75
 Red-legged Partridge *Alectoris rufa*, 75, 79
 Partridge *Perdix perdix*, 71, 75
 Quail *Coturnix coturnix*, 70, 71, 73, 75
 Pheasant *Phasianus colchicus*, 70, 71, 75
 Water Rail *Rallus aquaticus*, 74, 75, 76
 Corncrake *Crex crex*, 74, 75, 76, 77
 Moorhen *Gallinula chloropus*, 70, 75, 81
 Coot *Fulica atra*, 70, 75, 81
 Little Bustard *Otis tetrax*, 75
 Oystercatcher *Haematopus ostralegus*, 70, 75
 Ringed Plover *Charadrius hiaticula*, 75
 Little Ringed Plover *Charadrius dubius*, 75
 Kentish Plover *Charadrius alexandrinus*, 75
 Lapwing *Vanellus vanellus*, 70, 75, 76
 Dunlin *Calidris alpina*, 77
 Redshank *Tringa totanus*, 70, 75
 Common Sandpiper *Tringa hypoleucos*, 75
 Black-tailed Godwit *Limosa limosa*, 70, 73, 75
 Curlew *Numenius arquata*, 74, 75, 76, 79
 Woodcock *Scolopax rusticola*, 75
 Snipe *Gallinago gallinago*, 71, 75
 Swinhoe's Snipe *Gallinago megala*, 72
 Black-winged Stilt *Himantopus himantopus*, 75
 Avocet *Recurvirostra avosetta*, 70, 75
 Stone Curlew *Burhinus oedipnemus*, 75
 Pratincole *Glareola pratincola*, 75
 Little Gull *Larus minutus*, 74
 Black-headed Gull *Larus ridibundus*, 71, 74
 Herring Gull *Larus argentatus*, 71
 Kittiwake *Rissa tridactyla*, 77
 Caspian Tern *Hydroprogne tschegrava*, 73
 Sandwich Tern *Sterna sandvicensis*, 77
 Little Tern *Sterna albifrons*, 73
 Pin-tailed Sandgrouse *Pterocles alchata*, 75
 Woodpigeon *Columba palumbus*, 70, 74, 75, 78, 80
 Rock Dove *Columba livia*, 75
 Collared Dove *Streptopelia decaocto*, 71, 75
 Turtle Dove *Streptopelia turtur*, 75, 78
 Rufous Turtle Dove *Streptopelia orientalis*, 72
 Cuckoo *Cuculus canorus*, 70, 74, 75, 79, 80
 Oriental Cuckoo *Cuculus saturatus*, 72
 Great Spotted Cuckoo *Clamator glandarius*, 75
 Barn Owl *Tyto alba*, 75
 Eagle Owl *Bubo bubo*, 73, 75

- Long-eared Owl *Asio otus*, 71, 75
 Short-eared Owl *Asio flammeus*, 75
 Scops Owl *Otus scops*, 71, 75
 Tengmalm's Owl *Aegolius fimerens*, 75
 Little Owl *Athene noctua*, 71, 75
 Pygmy Owl *Glaucidium passerinum*, 75
 Tawny Owl *Strix aluco*, 70, 75, 78, 79
 Nightjar *Caprimulgus europaeus*, 70, 74, 75
 Pallid Swift *Apus pallidus*, 75
 Swift *Apus apus*, 75, 76, 77
 Alpine Swift *Apus melba*, 75
 Kingfisher *Alcedo atthis*, 75
 Bee-eater *Merops apiaster*, 71, 75
 Roller *Coracias garrulus*, 75
 Hoopoe *Upupa epops*, 71, 75
 Wryneck *Jynx torquilla*, 70, 74, 75
 Green Woodpecker *Picus viridis*, 75, 78, 81
 Grey-headed Woodpecker *Picus canus*, 75, 80
 Black Woodpecker *Dryocopus martius*, 74, 75
 Great Spotted Woodpecker *Dendrocopos major*, 70, 74, 75, 78, 80, 81
 Middle Spotted Woodpecker *Dendrocopos media*, 75
 White-backed Woodpecker *Dendrocopos leucotos*, 75
 Lesser Spotted Woodpecker *Dendrocopos minor*, 74, 75
 Three-toed Woodpecker *Picoides tridactylus*, 75
 Woodlark *Lullula arborea*, 74, 81
 Skylark *Alauda arvensis*, 70, 74, 79, 80, 81
 Sand Martin *Riparia riparia*, 73, 75
 Crag Martin *Hirundo rustica*, 75
 Swallow *Hirundo rustica*, 70, 75
 House Martin *Delichon urbica*, 70, 75, 77
 Tawny Pipit *Anthus campestris*, 75
 Indian Tree Pipit *Anthus hodgsoni*, 72
 Meadow Pipit *Anthus pratensis*, 75, 81
 Tree Pipit *Anthus trivialis*, 70, 74, 75
 Water/Rock Pipit *Anthus spinoletta*, 75
 Yellow Wagtail *Motacilla flava*, 75, 77
 Grey Wagtail *Motacilla cinerea*, 77
 Pied/White Wagtail *Motacilla alba*, 74, 75, 76, 77
 Red-backed Shrike *Lanius collurio*, 76
 Waxwing *Bombicilla garrulus*, 70
 Dipper *Cinclus cinclus*, 73, 75
 Wren *Troglodytes troglodytes*, 70, 74, 75
 Alpine Accentor *Primella collaris*, 75
 Dunnock *Primella modularis*, 70, 71, 81
 Cetti's Warbler *Cettia cetti*, 71
 Chinese Bush Warbler *Bradypterus tacsanowskii*, 72
 Gray's Grasshopper Warbler *Locustella fasciolata*, 72
 Savi's Warbler *Locustella luscinioides*, 73
 River Warbler *Locustella fluviatilis*, 73, 74
 Pallas's Grasshopper Warbler *Locustella certhiola*, 72
 Grasshopper Warbler *Locustella naevia*, 70, 71, 73, 74, 81
 Lanceolated Warbler *Locustella lanceolata*, 72
 Sedge Warbler *Acrocephalus schoenobaenus*, 70, 74, 81
 Blyth's Reed Warbler *Acrocephalus dumetorum*, 74
 Marsh Warbler *Acrocephalus palustris*, 70, 73, 74, 81
 Reed Warbler *Acrocephalus scirpaceus*, 70, 71, 74, 81
 Great Reed Warbler *Acrocephalus arundinaceus*, 70, 71, 74
 Thick-billed Warbler *Acrocephalus aedon*, 72
 Icterine Warbler *Hippolais icterina*, 70, 71, 74, 80
 Barred Warbler *Sylvia nisoria*, 74
 Garden Warbler *Sylvia borin*, 70, 74, 78, 81
 Blackcap *Sylvia atricapilla*, 70, 74, 78, 81
 Whitethroat *Sylvia communis*, 70, 71, 74, 81
 Lesser Whitethroat *Sylvia curruca*, 70, 71, 74
 Willow Warbler *Phylloscopus trochilus*, 70, 74, 78, 80, 81
 Chiffchaff *Phylloscopus collybita*, 70, 73, 74, 78, 81
 Siberian Chiffchaff *Phylloscopus collybita tristis*, 72
 Radde's Warbler *Phylloscopus schwarzi*, 72
 Wood Warbler *Phylloscopus sibilatrix*, 70, 73, 74
 Arctic Warbler *Phylloscopus borealis*, 72
 Greenish Warbler *Phylloscopus trochiloides*, 73, 74
 Goldcrest *Regulus regulus*, 70, 73, 75, 80
 Firecrest *Regulus ignicapillus*, 75
 Pied Flycatcher *Ficedula hypoleuca*, 70, 74, 75

BRITISH BIRDS

- Collared Flycatcher *Ficedula albicollis*, 75
 Mugimaki Flycatcher *Ficedula mugimaki*, 72
 Red-breasted Flycatcher *Ficedula parva*, 70, 73, 74
 Spotted Flycatcher *Muscicapa striata*, 75, 76, 77
 Whinchat *Saxicola rubetra*, 70, 71, 73
 Stonechat *Saxicola torquata*, 74, 77
 Wheatear *Oenanthe oenanthe*, 70, 77
 Black Redstart *Phoenicurus ochruros*, 73
 Redstart *Phoenicurus phoenicurus*, 70, 74
 Robin *Eritbacus rubecula*, 70, 74, 80, 81
 Nightingale *Luscinia megarhynchos*, 70, 80, 81
 Thrush Nightingale *Luscinia luscinia*, 70, 74
 Siberian Rubythroat *Luscinia calliope*, 72
 Bluethroat *Luscinia svecica*, 76
 Siberian Blue Robin *Luscinia cyane*, 72
 Swinhoe's Pseudorobin *Pseudaedon sibilans*, 72
 Red-flanked Bluetail *Tarsiger cyanurus*, 72
 Fieldfare *Turdus pilaris*, 74, 76, 80
 Ring Ouzel *Turdus torquatus*, 77
 Blackbird *Turdus merula*, 70, 74, 79, 80, 81
 Redwing *Turdus iliacus*, 70, 74
 Song Thrush *Turdus philomelos*, 70, 74, 79, 81
 Mistle Thrush *Turdus viscivorus*, 70, 71, 80
 White's Thrush *Zootbera dauma*, 72
 Long-tailed Tit *Aegithalos caudatus*, 74
 Willow Tit *Parus montanus*, 74
 Crested Tit *Parus cristatus*, 73
 Coal Tit *Parus ater*, 80
 Blue Tit *Parus caeruleus*, 70, 77, 81
 Great Tit *Parus major*, 70, 74, 80, 81
 Nuthatch *Sitta europaea*, 73, 75
 Wallcreeper *Tichodroma muraria*, 75
 Treecreeper *Certhia familiaris*, 70, 75, 77
 Short-toed Treecreeper *Certhia brachydactyla*, 75
 Corn Bunting *Emberiza calandra*, 70, 73, 81
 Yellowhammer *Emberiza citrinella*, 70, 71, 74
 Ortolan Bunting *Emberiza hortulana*, 74
 Rustic Bunting *Emberiza rustica*, 72
 Yellow-breasted Bunting *Emberiza aureola*, 74
 Reed Bunting *Emberiza schoeniclus*, 70, 74, 81
 Chaffinch *Fringilla coelebs*, 70, 74, 81
 Brambling *Fringilla montifringilla*, 72
 Citril Finch *Carduelis citrinella*, 75
 Serin *Serinus serinus*, 73, 75
 Greenfinch *Carduelis chloris*, 70, 74, 81
 Siskin *Carduelis spinus*, 75, 76
 Goldfinch *Carduelis carduelis*, 73, 81
 Linnet *Carduelis cannabina*, 70, 71, 76
 Redpoll *Carduelis flammea*, 75
 Scarlet Grosbeak *Carpodacus erythrinus*, 74
 Crossbill *Loxia curvirostra*, 75
 Bullfinch *Pyrrhula pyrrhula*, 75
 House Sparrow *Passer domesticus*, 73
 Tree Sparrow *Passer montanus*, 73, 76
 Snow Finch *Montifringilla nivalis*, 75
 Starling *Sturnus vulgaris*, 70, 74, 75, 78
 Golden Oriole *Oriolus oriolus*, 70, 74, 79, 80
 Jay *Garrulus glandarius*, 70
 Magpie *Pica pica*, 70, 74, 76, 77
 Nutcracker *Nucifraga caryocatactes*, 72
 Jackdaw *Corvus monedula*, 70, 73, 77
 Rook *Corvus frugilegus*, 77, 78
 Carrion Crow *Corvus corone*, 70, 72, 77, 80
 Raven *Corvus corax*, 70

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NOTES

Deane) from the German and French. Donald Glanville compiled the cross-index, and the whole was carefully checked and typed by Mrs. Anne Norris. The presentation, nomenclature and systematics are much the better for a thorough checking by James Ferguson-Lees and I am particularly grateful to him for keeping me on the straight and narrow.

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Notes

Heron swallowing female Blackbird.—In early September 1965 a late brood of three young Herons *Ardea cinerea* seemingly fell from their nest in the grounds of Viewfield House, near Portree, Isle of Skye, Inverness-shire. They appeared on the lawn where Colonel and Mrs. Jock MacDonald fed them with fish. In the weeks that followed, although apparently still being fed by the adult Herons as late as 30th September, they became so tame that when called they would glide down from the high trees, walk up to Mrs. MacDonald and take fish from her hand.

On 5th October Colonel MacDonald was watching one of these young Herons, by then full-winged, on the lawn. An adult female Blackbird *Turdus merula* was feeding on worms near-by. All at once, with a lightning dart, the Heron seized the Blackbird and in an instant had swallowed it whole.

SETON GORDON

[In his monograph on *The Heron* (1954) Frank A. Lowe mentioned several instances of various bird species being eaten by Herons. We showed the above to him and he expressed interest because the actual capture of such prey is seldom observed, though Herons are omnivorous and evidently not uncommonly take and swallow Brown Rats *Rattus norvegicus* and other mammals which are larger than a Blackbird. Mr. Lowe also contributed the following note.—Eds.]

Heron swallowing Mole.—In my book *The Heron* (1954) I stressed the frequency with which the remains of Moles *Talpa europaea* have been found in the pellets of Herons *Ardea cinerea* and invited observations showing how these mammals are caught. In October 1960 I received

a letter from R. Brooke of Goring, Oxfordshire, from which the following are extracts:

'One summer morning about 7 a.m. I saw a Heron on the lawn . . . waiting to strike . . . suddenly the swift stab and up comes the head with a live Mole crossways in the beak . . . it is hard to see whether the fore paws did move a little. Otherwise no movement for some 12 or 15 seconds. Then a slight jerk of the beak and the Mole was swallowed. . . . The conclusion I came to was that this Heron was watching the movement of the earth as the Mole tunnelled its way just below the surface and struck at the moment of exact range. Actually I have twice caught Moles in their tunnels in my hands merely because I was standing still and saw the earth heave at my feet. A sudden grab with both hands and there it is alive. It is reasonable to assume that Herons have this technique developed to a fine art. . . .'

I visited Mr. Brooke shortly after receiving his letter and discussed its contents with him. I was left in no doubt that this was indeed the technique adopted in catching Moles.

FRANK A. LOWE

Long-tailed Duck somersaulting while bathing.—The recent notes on somersaulting by geese and swans (*Brit. Birds*, 56: 190-191; 58: 58-60, 383-384) prompt me to record similar behaviour by a drake Long-tailed Duck *Clangula hyemalis* at Chard Reservoir, Somerset, on 12th March 1961.

This bird was swimming alone near the shore and, when I first saw him, was preening in the normal way and occasionally diving. After one dive, however, he surfaced belly uppermost with actions closely resembling those described in the previous notes. In addition, he was vigorously kicking his feet, thus sending up a thick spray, and simultaneously preening the feathers on his belly. After a few moments he righted himself by rolling over sideways and then, after further preening, adopting a sleeping attitude with beak buried in scapulars.

This Long-tailed Duck was in no way agitated or excited by any other bird or person and I concluded that this must be normal bathing behaviour and not any form of display.

DAVID E. PAULL

Kestrel settling on sea.—About 10.30 a.m. on 10th October 1965, at Portland Bill, Dorset, I saw a Kestrel *Falco tinnunculus* flying in over the sea from a southerly direction. A force 4-5 easterly wind was blowing and the bird was having difficulty keeping on course. When about a hundred yards off the Bill it pitched on to the sea and floated there with its tail at an angle of about 45°. After approximately two minutes it took off easily from the crest of a wave and flew strongly to the shore, apparently none the worse for its wetting.

R. F. COOMBER

[Other recent records of land birds settling temporarily on the sea

have concerned Reed Buntings *Emberiza schoeniclus* (*Brit. Birds*, 52: 238) and a Song Thrush *Turdus philomelos* (*Brit. Birds*, 55: 238-239).—EDS.]

Kestrel catching Weasel.—On 28th October 1964, near Dumfries, I saw a Weasel *Mustela nivalis* run across the road in front of my car. A female Kestrel *Falco tinnunculus* which was hovering overhead flew down, caught the Weasel while it was still on the tarmac, carried it up to a height of 40-50 feet and then let it fall on to the grass verge. I went to look for it but could find nothing. SYBIL SELWYN

[*The Handbook* includes one record of a Weasel among the prey of the Kestrel and adds that this falcon has also been seen to attack a Stoat *M. erminea*. In fact, however, Dr. N. Tinbergen believes that this is not so unusual. In the present case, it seems interesting that the Kestrel dropped the Weasel and she may possibly have been bitten. Dr. J. S. Ash has provided the following weights of Weasels: males 70-170 grams, average 115 grams (162 weighed); females 35-90 grams, average 59 grams (36 weighed).—EDS.]

Turnstones and Oystercatcher feeding on dead mammal.—The editorial comment accompanying the note by Colin Selway and Michael Kendall on a Turnstone *Arenaris interpres* feeding on a dead sheep (*Brit. Birds*, 58: 438) prompts me to draw attention to a comparable record in the *Lancashire Bird Report, 1963* (p. 23). At Morecambe, Lancashire, in late December 1963, at a time when the weather was quite mild, K. E. Hague watched two Turnstones and an Oystercatcher *Haematopus ostralegus* 'eating strips of fatty tissue from a small dead mammal (?cat)'. K. G. SPENCER

Stock Doves nesting in derelict military tanks.—On 8th August 1965, on Red Horn Hill Artillery Range near Devizes, Wiltshire, we found the nest of a pair of Stock Doves *Columba oenas* inside the turret of one of a number of derelict army tanks. This contained two eggs, but was unfortunately deserted; near-by we found a dead adult which had apparently climbed inside a shell rack and become trapped. It occurred to us that the tanks made ideal nesting sites for this species and that the only possible alternatives in this area of downland were the concrete War Department shelters. We therefore searched four other tanks. Two of these contained nests with eggs and a third an empty nest which appeared recently built. There was no sign of more than one nest in any tank.

A week later we searched a total of five more tanks about a mile away and three of these had nests inside them. One held two young five or six days old and in another we found an adult squatting behind the exhaust system near an incomplete nest.

The fact that seven out of ten tanks selected entirely at random showed evidence of breeding Stock Doves suggested that this range was supporting a high population of this species. Several of the tanks had only recently been abandoned and this illustrates the rapidity with which the birds had adapted themselves to utilise these new sites and to colonise an area which could otherwise have held only a very small population.

Not a single nest was discovered in any of the disused W.D. shelters, but at least four pairs of Stock Doves were established in rabbit holes in the sandbag protection barrier near one of these. R. E. Scott informs us that at Dungeness, Kent, where basically the situation is similar, Stock Doves have nested in the W.D. shelters but there is no record of their breeding in any of the disused tanks.

RICHARD LEE and JULIAN C. ROLLS

Numbers of Skylarks flying inside house at night.—At about 11 p.m. on 26th November 1965, when it was snowing, our maid heard a tapping on one of the bedroom windows of our house at Borgue, Kirkcudbright. As she opened the window to see what was making the noise, a number of Skylarks *Alauda arvensis* flew into the room. A little later more came in when the back door was opened and then still more entered through another bedroom window. By this time there were several dozens inside the house. Many of them eventually flew out again, but a dozen or so remained all night until we caught them and put them out next morning. Presumably the Skylarks were originally attracted by the light showing through unclosed curtains.

J. DOUGLAS BROWN

[This interesting observation seems comparable with what happens to migrants at lighthouses on dark nights with rain or mist, except that on this occasion it was snowing and the Skylarks were possibly part of a hard-weather movement. It may not be so unusual for migrant birds to be attracted by the lights of houses, particularly in coastal areas. Dr. J. S. Ash tells us that he used occasionally to have swarms of Goldcrests *Regulus regulus* at the windows of his former home on the Northumberland coast. It would be useful to have further observations.—EDS.]

Great Grey Shrike capturing Dunnock at roost in bush.—Dr. Horst Mester's paper on the feeding habits of the Great Grey Shrike *Lanius excubitor* in winter (*Brit. Birds*, 58: 375-383) prompts me to record the following incident. At 4 p.m. on 9th November 1963, in failing light, I and other observers watched a Great Grey Shrike enter a small elder bush at Spurn Bird Observatory, Yorkshire, and work its way down into the thick growth at the base. There it evidently

captured a Dunnock *Prunella modularis*, but we did not realise this until feathers began to float out of the bush after the shrike had returned to a more elevated perch and started to feed. The stealthy method of hunting, and the fact that the Dunnock had probably gone to roost, now seem to me of possible significance in accounting for some of the fast-flying or skulking species of birds recorded as prey in Dr. Mester's paper.

T. M. CLEGG

American Robins in the Isles of Scilly.—On 20th December 1963 F. H. D. Hicks mist-netted an American Robin *Turdus migratorius* on the sand bar between the Gugh and St. Agnes, Isles of Scilly. It was in an emaciated condition and had allowed a close approach as it fed by the shore. After being ringed it was shown to Miss Hilda Quick and other interested islanders and was then released near the bird observatory. It flew off weakly and was not seen again until its mangled corpse was found near-by a few days later. It was believed to have been mauled by a dog. During the preceding two weeks a second American Robin had been present on the Gugh where it was found by Jack Hick and identified by Donald Hicks. For a day or two just prior to the 20th two were present at the same time on the Gugh side of the sand bar, but by the 20th the (presumed) original one had disappeared, leaving only the (presumed) recently arrived and emaciated individual.

Both were described as being similar to a Blackbird *Turdus merula* in size, form and general behaviour, with uniform grey-black upper-parts and brick-red breast and belly. The following description and measurements of the one trapped have been compiled mainly from notes made by F. H. D. H. with it in the hand, but partly also from colour photographs taken at the time by Mrs. Lewis Hicks and Donald Hicks, and from the skeleton now in my possession:

Upper-parts generally grey-black, but feathers of crown tipped with paler grey; uniform grey-black tail with outer feathers tipped white. White chin and upper throat; lower throat white, heavily streaked black; breast and belly brick-red with small greyish tips to feathers of lower breast and belly; vent and under tail-coverts white. Cheeks grey-black; incomplete white orbital ring with largest region of white just forward of the eye. Under-wings bright reddish from base of wing to carpal. Lower mandible yellow-orange, upper mandible horn; gape bright yellow; legs dark brown. Measurements: wing 134 mm., tarsus 32 mm., bill from skull 23 mm., tail about 95 mm. It was not weighed.

The relatively small areas of white on the tips of the outer rectrices suggest that it was in first-winter plumage. J. L. F. PARSLow

[These are the sixth and seventh American Robins recorded wild in Britain and Ireland. The first was on Lundy, Devon, in October and

November 1952 (*Brit. Birds*, 46: 364-368) and since then there have been others in Co. Wexford (1954), Co. Kerry (1955), Orkney (1961) and Devon (1962, Lundy again). With the exception of the one in Orkney in May, all have been in the winter months between late October and mid-January.—Eds.]

Reviews

The Life of the Robin. By David Lack. Drawings by Robert Gillmor. Witherby, London, 1965 (revised edition). 240 pages; numerous line drawings. 30s.

Of the scientific bird books published in the last 25 years, *The Life of the Robin* is surely the most readable. It set a pattern for writing a bird's life history which has been widely followed, though never with such happy results. What was the secret of its success?

David Lack's work on the Robin was the first English example of the value of colour-ringing a small population of a common bird and following it consistently over several years. Earlier, Mrs. M. M. Nice had studied Song Sparrows in this way in America; and, earlier still, J. H. Burkitt had done the same with Robins in Ireland, though he did not carry the analysis of his results very far. It is true that Dr. Lack added considerably to the value of his observations by keeping Robins in aviaries and doing some experiments, now famous, which showed that the red breast feathers alone release aggressive behaviour in a territorial rival. But it was not just that he was one of the first in the field, and contributed these and other scientific advances, that made *The Life of the Robin* such a good book. One can think of bird books of equal scientific importance that are read only by specialists because they have to do so.

I think that the ingredients of this book's success were its lucid style and its happy synthesis of detailed ornithological facts, stimulating biological interpretations of these facts, pertinent parallels with the human situation, and apt literary quotations. As a result, it could hold the attention of any intelligent reader, even if he were not especially interested in birds. This is where it scored so heavily over most later species monographs, and why it achieved the distinction of a Penguin edition.

The small red-covered edition, printed on war-time paper, has a place in many bird-watchers' libraries. Those who came along later mostly have the Penguin edition. This new edition now issued by Witherby,

the fourth, is partly a sign of increasing affluence; it costs four times as much as the original and is much bigger and more handsome. It does, however, also offer a good deal more than the earlier editions. The photographs are replaced by drawings by Robert Gillmor, who has also drawn a delightful series of chapter headings and tail pieces. There is a new chapter on 'forest Robins', a certain amount of extra material has been added to other chapters, and some discussions have been amended in the light of later research. Paper, print and binding are all of the highest quality.

Dr. Jack ends his last chapter with a plea. Although his book was 'written to stimulate, not inhibit, research', little has in fact been published about Robins since he ended his study. 'So much more awaits discovery, and discovery is so enjoyable, that I hope new readers will act more quickly than their predecessors, for, to quote Gilbert White yet again, "subjects of this kind are inexhaustible"'. D. W. SNOW

The Wood-Pigeon. By R. K. Murton. Collins, London, 1965. 256 pages; one coloured and 39 black-and-white photographs; 22 text figures. 25s.

This, the sixth of the excellent series of 'New Naturalist' special volumes devoted to a single bird, breaks much new ground. Although, like its predecessors, it covers all aspects of the species, the core of the book is an account of the fundamental ecology of the Woodpigeon based on many years' work by Dr. Murton and his colleagues. Such a major study was made possible because the Woodpigeon, a member of a rather dull group in the eyes of most ornithologists, had become, since myxomatosis struck down the Rabbits, the main vertebrate pest of the British farmer and the Government was under heavy pressure to find means of controlling its numbers.

Efficient control must be based on an exact knowledge of the natural forces affecting the population of the animal concerned. Dr. Murton, by laborious and skilful field work, was able to analyse the feeding habits and food supply of the Woodpigeons in his study area throughout the year, an almost unique achievement, and to correlate these with the changes in the numbers of the birds. He thus established that the size of the Woodpigeon population in early winter depended neither on the productivity nor on the success in the preceding breeding season, but on the availability of grain in the autumn, when poor supplies affected particularly the juveniles. He found that there was a second check on numbers during the winter months, when the level to which food supplies fell before the spring increase in clover determined the size of the summer breeding population. He showed further that shooting, even when heavy, did not regulate the population, but merely killed birds which would otherwise have died from starvation. As a result,

the official control policy has been modified and the heavily subsidised battue shooting withdrawn in favour of more selective measures.

Equally elegant and convincing is his demonstration that, although his Woodpigeons are physiologically capable of breeding for some seven months of the year, their actual nesting season in East Anglia and similar agricultural areas is restricted to a much shorter period by the availability of food. It is interesting that the urban Woodpigeons of central London, with ample supplies of bread provided by the public, have an earlier and much longer breeding period, with corresponding differences in seasonal behaviour.

This detailed research is clearly of fundamental interest, not only to ornithologists but to all students of animal population problems. The general bird-watcher, whilst learning much from the clear exposition of these findings, as relevant to problems of conservation as they are to those of control, will find much else of interest here, from the accounts of display and breeding behaviour to the exciting elucidation of the involved and much-disputed question of Woodpigeon movements in and out of the British Isles. He will find this book easy and stimulating to read; he may even be prepared to concede that pigeons are worth watching and studying.

STANLEY CRAMP

Letters

Birds trapped by sludge or mud

Sirs,—I was most interested to read the note by G. L. Webber (*Brit. Birds*, 58: 296-297) on 'Birds trapped by sludge on a sewage farm'. I have found at Freckleton sewage farm and various other sites in Lancashire, including the Ribble mud-flats, that this is not as uncommon as he suggests.

Besides most of the species he records, I have noted Ringed Plover *Charadrius hiaticula*, Black-tailed Godwit *Limosa limosa*, Wood Sandpiper *Tringa glareola*, Spotted Redshank *T. erythropus*, Knot *Calidris canutus* and Ruff *Philomachus pugnax* all trapped in mud or sludge. It is surprising that even the estuarine mud of the Ribble can be treacherous for these waders.

I have also a record of three Swallows *Hirundo rustica* trapped in the sludge of a sewage bed. The birds had evidently dived in whilst taking flies off the water surface.

M. GREENHALGH

Sirs,—We can add Herring Gulls *Larus argentatus*, Black-headed Gulls *L. ridibundus* and a Little Owl *Athene noctua* to G. L. Webber's list of birds trapped on sewage farms.

Both Herring Gulls and Black-headed Gulls are frequent visitors to Saltford sewage farm, Somerset, and sometimes become caught in the new sludge which is retained in large cylindrical vats. The gulls perch on the sides and, in reaching out for edible matter, now and then overbalance. Black-headed Gulls also try to obtain material away from the edge of the pits in flight and occasionally become involved thereby in the thick liquid. They are then left floundering with seldom a chance of extrication unless somebody appears on the scene in time to rescue them. The numbers trapped have unfortunately not been recorded and, in any case, many of the victims have been seen only by persons employed on the farm.

The Little Owl was found embedded in hard sludge at a small sewage farm near Sidlesham Ferry, Sussex, on 3rd November 1963. Its plumage was so matted that it was incapable of flight, but K.H. kept it for two days and carefully cleaned and fed it. As it then appeared to have recovered, it was released at Claverton Down, Somerset, and flew away strongly.

KEN HAWKINS and BERNARD KING

Kestrel temporarily trapped by sludge on sewage farm

Sirs,—G. L. Webber's note (*Brit. Birds*, 58: 296-297) reminds me of an occasion when a Kestrel *Falco tinnunculus* narrowly escaped a similar fate. On 6th August 1959, at Perry Oaks sewage farm, Middlesex, I was watching five Common Sandpipers *Tringa hypoleucos* feeding on a flooded sludge lagoon when they suddenly scattered in all directions as an adult male Kestrel swooped down and landed amongst them without succeeding in catching one. The Kestrel became partially submerged in the slime and floundered for several yards before reaching more solid ground. After resting for a few moments there, it took off with some difficulty and flew away very heavily.

G. BEVEN

News and comment

Edited by J. L. F. Parslow

Change in chairmanship of Bird Ringing Committee.—The retirement of Sir Landsborough Thomson as chairman of the Ringing and Migration Committee of the British Trust for Ornithology marks the end of an association which goes back to the very beginning of organised bird ringing in this country. In 1909 two inde-

pendent ringing schemes were launched, one, which continued for about ten years, by Landsborough Thomson at Aberdeen, and the other, which subsequently became the present day national scheme, by H. F. Witherby in connection with *British Birds*. The responsibility for the organisation of this latter scheme was handed over to the B.T.O. in 1937 and Sir Landsborough was appointed chairman of the committee which was set up to administer it. In terms of the annual numbers of birds ringed, Sir Landsborough's period of almost 20 years in office has seen a tenfold increase in the size of the scheme, and his efforts behind the scenes have been largely responsible for the satisfactory and very necessary provision of the extra funds and staff required to keep pace with its rapid growth. His successor is Dr. P. R. Evans, a member of the Edward Grey Institute, who for the past three years has been working on problems connected with migration, mainly on the Northumberland coast.

'The Natural History of Upper Teesdale'.—The declared opposition by the Botanical Society of the British Isles, the Northumberland and Durham Naturalists' Trust, the Nature Conservancy and many other organisations to the proposed construction of a reservoir at Cow Green in Upper Teesdale has already received much publicity in the national press and elsewhere. The very widespread concern which is being shown by botanists and other naturalists to the threatened destruction of this unique area is indicated by the initial response to the appeal which was launched by the Upper Teesdale Defence Committee last August. Within a few weeks more than 3,000 people had contributed approximately £7,500 towards the fund, to be used to prepare and present the best possible case for the conservation of the area at the anticipated public enquiry. Now, a most timely and valuable handbook, *The Natural History of Upper Teesdale*, has been published, the proceeds from which will go to the Defence Fund. This 70-page illustrated booklet is attractively produced and is edited by Professor D. H. Valentine. Not unnaturally, the main emphasis is on the remarkable Teesdale flora, its history and origin, and also its future conservation. But there are also various chapters on the geology and animals of the region, including an account by K. R. Ashby of its birds. Copies of the booklet are obtainable from the Secretary, Northumberland and Durham Naturalists' Trust, Hancock Museum, Barras Bridge, Newcastle upon Tyne 2. In these days of soaring printing costs, it represents remarkable value at 5s. 6d., post free.

Bernard Tucker Medallist.—At the annual dinner of the British Trust for Ornithology, held on 27th November during their 'Birdwatchers' Conference' week-end at Swanwick, Derbyshire, more than 250 members and guests saw the presentation to R. K. Cornwallis of the Bernard Tucker Medal for 1965. The award was made to Mr. Cornwallis, a former honorary secretary and vice-president of the B.T.O., for his 'long service to the Trust . . . especially in connection with his work on bird migration', and was presented to him by the president, R. C. Homes.

Scottish Countryside Commission announced.—On 17th November the Secretary of State for Scotland announced in the House of Commons that a Countryside Commission for Scotland is to be set up. At present there is no legislation in Scotland which corresponds with the National Parks Act, 1949, and the Commission will consider the desirability of extending to Scotland the appropriate provisions of that Act. It will also be concerned with the Scottish countryside as a whole in view of the 'growing problem of preserving the many areas of outstanding scenic beauty, and at the same time ensuring that the recreational and tourist potential is developed to the full and in the best way'. A letter inviting comments on the Commission's functions has been sent out by the Scottish Development Department to 18 organisations in Scotland. These include the Nature Conservancy's Scottish Office, but

curiously exclude a number of other bodies concerned with nature conservation and ornithology in Scotland, notably the Scottish Wildlife Trust and the Scottish Ornithologists' Club.

Toxic chemicals and birds.—Over the last five years the excellent response to the requests to send to the Royal Society for the Protection of Birds any bodies of birds suspected to have died from toxic chemicals has greatly assisted in extending our knowledge of the effects of these chemicals on wildlife and in securing improved methods of control. It is now, however, generally accepted that pesticides in small amounts are present throughout the environment and that almost any bird examined will contain residues. The vital questions still remaining are how, precisely, those pesticides got there, and what effects they are having on bird populations and on the birds themselves.

The joint Committee of the British Trust for Ornithology and the R.S.P.B. on Toxic Chemicals now feels that, with the limited resources available, toxicological analyses should be concentrated on particular projects. Areas of different habitat will be selected and dead birds and other organisms from these will be tested in an effort to establish the pattern of the spread and possible build-up of pesticides in the environment. At the same time the numbers and breeding success of the bird populations will be investigated to see if there is any correlation between changes in these populations and pesticide use.

It is therefore requested that *no further bodies of birds should be sent to the R.S.P.B. for analysis*. However, birds of prey (other than Tawny Owls) and fresh-water fish-feeding birds, such as grebes, Herons and Kingfishers, are still urgently required by the Nature Conservancy and should be sent direct to Ian Prestt, at Monks Wood Experimental Station, Abbots Ripton, Huntingdon. The packages should be marked 'Specimen' on the outside.

Ornithologists can still provide vital assistance in assessing the effects of pesticides on wildlife by taking part in the general population enquiries being undertaken by the B.T.O. and R.S.P.B., including, for example, the Common Birds Census, the Golden Eagle Enquiry and the Nest Record Scheme. They can also help by reporting *urgently* to the R.S.P.B. at The Lodge, Sandy, Bedfordshire, any large-scale deaths of birds where poisoning is suspected.

Tragic death of Stephen Boddy.—We have learned with deep regret of the tragic death of Stephen Boddy, who died when his car caught fire and was burnt out near Waddesdon, Buckinghamshire, on 12th November. As assistant secretary of the British Trust for Ornithology he was well known to many ornithologists throughout the country, especially through having travelled widely soliciting support for the Trust's Common Bird Census scheme. In 1965 he was a member of the ringing expedition to south-east Morocco. His loss will be mourned not only by the members and staff of the B.T.O. but also by the many other bird-watchers who knew him.

New appointments.—C. K. Britton, assistant warden of Skokholm Bird Observatory during 1965, has been appointed warden there by the Field Studies Council and the Edward Grey Institute. He succeeds Dr. M. P. Harris. His assistant during 1966 will be Michael Alexander who formerly held a similar position on the near-by island of Skomer.

Roger Bailey has recently joined the staff of the Populations Section of the British Trust for Ornithology. As a D.Phil. student at the Edward Grey Institute he took part in two long voyages on board *Discovery III* to the Indian Ocean where he made studies into the distribution and ecology of various sea-birds.

Forthcoming conferences and courses.—It cannot be said that the occurrence during 1966 of the 14th International Ornithological Congress at Oxford in July is causing any curtailment in the conference activities of the main British ornithological organisations. Rather, the reverse seems to be the case and regular attenders of bird conferences and residential courses would appear to be in for a busy year. Following their annual Bird Observatories Conference at Oxford on 8th and 9th January, the British Trust for Ornithology have announced a week-end course entitled 'Modern Trends in Bird Study' at Pindley Manor, Tring, from 18th to 20th February, a Ringers' Conference at Liverpool from 15th to 17th April, and a course on 'Bird Census Work' at Malham Tarn Field Centre at Whitsun. Other courses on census work and migration studies are planned by the B.T.O. in spring and autumn at various bird observatories, while for the second year in succession they will be holding a 'Birdwatchers' Conference' at Swanwick, Derbyshire, in the late autumn.

The annual conference of the British Ornithologists' Union is to be held in Cambridge from 1st to 4th April on the theme of 'Waders'. Most contributions will be on feeding ecology and migration.

Wilfrid Backhouse Alexander

1885-1965

With deep regret we have to announce the death of W. B. Alexander in Dorset on 18th December 1965 at the age of 80. A few of the highlights in his crowded ornithological life included his little masterpiece *Birds of the Ocean* (1928); his association with the later volumes of *The Handbook of British Birds*; his creation of the unique library which bears his name in the Edward Grey Institute at Oxford, of which he was also the first Director; and his championship of the bird observatory system in its early days, which resulted in his becoming the first Chairman of the Bird Observatories Committee. He was also a highly valued member of the editorial board of *British Birds* from 1951 to 1959 and an honorary editor thereafter. A full obituary will appear as soon as possible.

S.C., I.J.F.-L., P.A.D.H., E.M.N.

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reference to organochlorine residues

D. J. Jefferies and I. Prestt

British bird-photographers: 6—H. G. Wagstaff
(with eight plates)

Movements of British Robins as shown by ringing
D. W. Snow

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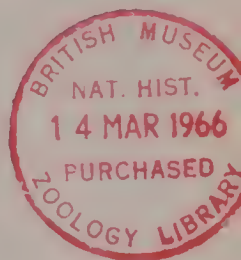
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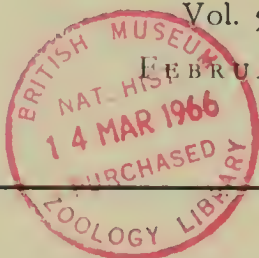
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British Birds

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FEBRUARY 1966



Post-mortems of Peregrines and Lanners with particular reference to organochlorine residues

By D. J. Jefferies and I. Prestt

Monks Wood Experimental Station, The Nature Conservancy, Huntingdon

INTRODUCTION

SINCE 1962, when the enquiry into the status of the Peregrine *Falco peregrinus* was completed (Ratcliffe 1963), there has been widespread concern about the decline of this species in Great Britain. Ratcliffe found strong circumstantial evidence that the persistent organochlorine insecticides were the cause, and the pattern of the decline showed a close correlation, both geographically and in time, with their increasing use in agriculture. Also, both eggs and an adult Peregrine have been proved to contain residues of dieldrin, heptachlor epoxide, isomers of BHC and DDT and metabolites (Ratcliffe 1965; Moore and Ratcliffe 1962). However, the presence of residues in the body of a dead bird does not necessarily mean that they caused its death. Some species of birds may carry considerable quantities of these materials without any external signs of distress (Bernard 1963; Turtle *et al.* 1963; D. J. Jefferies, work in progress).

The sensitivity of birds to the various pesticides can be measured by feeding trials similar to those carried out by Bernard (1963) with DDT and House Sparrows *Passer domesticus*. After chemical analyses these studies provide ranges of internal residues which, if found in a dead bird, allow one to say with a fair degree of confidence that death was due to toxic chemicals. However, it is not always wise to extrapolate from species in one order or family to ones in others, e.g. from the House Sparrow to the Peregrine. The amounts needed to be ingested

and the residues of pesticides accumulated in the liver or brain before death are known to vary considerably between individuals (Bernard 1963) and between different orders (DeWitt *et al.* 1960, who demonstrated a seventeen-fold difference between the Starling *Sturnus vulgaris* and the Mallard *Anas platyrhynchos* with respect to their sensitivities to heptachlor as shown by the lethal dose to 50%—otherwise written as L.D.50). There may also be differences due to age and sex (DeWitt *et al.* 1960). To obtain data on the susceptibility of the Peregrine by feeding experiments would be difficult and is not at present being attempted. We must rely, therefore, on other evidence, as in the cases described here.

Two Lanners *Falco biarmicus*, which were being trained for falconry, died suddenly for no obvious reasons and after veterinary examination were sent to the Nature Conservancy for chemical analysis. The presence of substantial residues of organochlorine insecticides and the absence of any other cause of death make it likely that both died from these substances. Thus they provide valuable evidence about the amounts of organochlorine insecticides present as organ residues when one of the large falcons is poisoned and dies. Lanners are of the same genus and about the same weight as Peregrines, and probably have similar susceptibilities. The organ residues and histories of these two Lanners are detailed below and compared with those of four British Peregrines examined in our laboratory and one Peregrine studied in Holland.

METHODS

Measurements of specimens followed Witherby *et al.* (1938-41); the right wing was measured in each case and the bill from cere to tip. The birds were also examined for state of moult as the stress involved may alter susceptibility. The notation used below for feather growth is that of Cornwallis and Smith (1963) (i.e. O signifies an old feather, 1 to 4 stages of growth in ascending order and N a new feather). Both the primaries and secondaries are numbered from the outermost to the innermost, the right wing only being given. The rectrices are numbered dorsally from left to right.

On dissection, the liver and in some cases also the brain and breast muscle were removed for analysis of organochlorine insecticide residues. The methods used and the analysts involved are given in the tables. Extractions were carried out by shaking with hexane and clean-up was effected by DMF partition and alumina column chromatography, as described by de Faubert Maunder *et al.* (1964b). Wherever possible, extracts were examined by gas-liquid chromatography with an electron capture detector, following the method of Goodwin *et al.* (1961) as detailed by de Faubert Maunder *et al.* (1964a). Residues

Table 1. Organochlorine residues in organs of two Lanners *Falco biarmicus* and five Peregrines *F. peregrinus*
Residues are expressed in parts per million. Analysts are detailed in the ACKNOWLEDGEMENTS on pages 62-63.
GLC is an abbreviation for gas-liquid chromatography

No. of Specimen	Species	Tissue	Heptachlor			Other		Analyst	Method
			pp'-DDE	Dieldrin	epoxide	BHC	BHC isomers		
330	Lanner	Liver	2.2	3.4	1.9	0.2	β 0.4	-	Gov Chem
		Brain	1.3	2.0	1.0	0.5	-	-	
		Breast muscle	1.4	1.8	0.9	0.4	β trace	-	
331	Lanner	Liver	3.8	6.1	1.4	trace	-	-	Gov Chem
		Brain	1.8	3.3	0.8	0.1	-	-	
		Breast muscle	1.7	2.8	0.6	0.1	-	-	
144	Peregrine	Liver	70.0	4.0	1.5	-	$\alpha\beta$ 2.0	-	Gov Chem
		Brain	45.0	3.5	1.3	-	$\alpha\beta$ 1.4	-	
		Breast muscle	20.0	1.3	0.3	-	$\alpha\beta$ 0.9	-	
581	Peregrine	Liver	6.3	0.6	0.2	-	β 0.3	-	Gov Chem
592	Peregrine	Liver	7.3	1.9	0.1	trace	β 0.5 α trace	-	Gov Chem
712	Peregrine	Liver	50.0	2.2	3.0	0.34	$\alpha < 0.2$ $\beta < 0.2$	-	Nat Cons
A	Peregrine	Liver	60.0	9.3	-	2.3	-	4.4	Kocman
		Brain	44.1	7.8	-	-	-	-	
		Breast muscle	41.7	7.5	-	-	-	-	

determined by gas-liquid chromatography were confirmed by paper chromatography and/or thin layer chromatography. Certain analyses were carried out by paper chromatography only, using the procedure described by Evans (1962).

FALCONS EXAMINED

Specimen 330: *Falco biarmicus*

Biological data. Female; immature; body weight unknown owing to prior veterinary examination, but Woodford (1960) gave the flying weights of the female Lanner as 1 lb. 8 oz. (680 grams) to 2 lb. (907 grams), which is slightly lighter than his figures for the female Peregrine, 1 lb. 15 oz. (879 grams) to 2 lb. 2 oz. (964 grams); wing 358 mm.; tail 210 mm.; bill 22 mm.; tarsus 51 mm. State of moult: 1st primary 4, 2nd-8th O, 9th-11th N; secondaries N; coverts, extensive moult in progress; tail O; body, extensive moult in progress.

History. Taken as a nestling in the Kisumu or Kisii district of Kenya on 21st October 1962. Trained for falconry by W. G. Fiske of Saffron Walden, Essex. In December 1963, when it had nearly completed its first moult (having been in moult about six weeks), it went off its food. Force feeding was tried in the final period and, although the bird felt thin, the weight loss was not great. It died later in the month.

The body, together with that of Specimen 331, was first sent to Dr. A. R. Jennings of the School of Veterinary Medicine, University of Cambridge, for post-mortem examination. He concluded that 'with regard to the two Lanners, neither of these birds showed any evidence of disease. There were no gross lesions indicative of virus, bacterial or parasitic infections.' Because of these negative findings the carcasses were sent on to the Nature Conservancy for chemical analysis. The analyses of the breast muscle, liver and brain showed considerable quantities of dieldrin and heptachlor epoxide; isomers of BHC and pp'-DDE were also present (table 1).

Since they came to England the Lanners had been fed on Pheasant *Phasianus colchicus*, Hare *Lepus europaeus*, Mallard *Anas platyrhynchos*, Moorhen *Gallinula chloropus* and Woodpigeon *Columba palumbus*. During December the diet was restricted to Mallard and Moorhen. The food was always gutted, but otherwise muscle, liver, fat and brain were all available and eaten, the birds being fed to repletion.

Specimen 331: *Falco biarmicus*

Biological data. Male; immature; body weight unknown owing to prior veterinary examination, but Woodford (1960) gave the flying weight of the male Lanner as 15 oz. (425 grams) to 1 lb. 4 oz. (567 grams), which is lighter than his weights for the male Peregrine, 1 lb. 4 oz. (567 grams)

to 1 lb. 7 oz. (652 grams); wing 307 mm.; tail 180 mm. (in moult); bill 19 mm.; tarsus 50 mm. State of moult: 1st primary N, 2nd 2, 3rd 3, 4th-5th N, 6th-8th O, 9th-10th N, 11th 3; 1st-8th secondaries N, 9th-10th 2, 11th-12th O; coverts, not moulted; tail, 5th and 8th N, 4th and 9th 4, 3rd and 10th 3, 1st and 12th 2, 2nd and 11th 1, 6th and 7th O; body, extensive moult in progress. The unusual moult may have been a result of being kept in captivity.

History. The same as Specimen 330, except that it died two to three weeks earlier.

Three other falcons were in Mr. Fiske's mews at the time of the death of the Lanners, though they were kept in buildings separated by 200 yards. These were two Peregrine, a male and a female, and a female Gyr Falcon *Falco rusticolus*. All were fed on the same diet as the Lanners. The female Peregrine, a young bird in 1963, fell ill at the same time as the Lanners and died shortly after them. Unfortunately it was not analysed for residues, but Dr. Jennings's examination showed that it 'had a very severe infection with *Polymorphus boschadis*. This is a nematode worm, normally parasitic in water birds, which causes very severe anaemia and emaciation.' Dr. Jennings expressed the opinion that this parasite was the immediate cause of death (but suggested that there was the possibility of chronic poisoning by insecticides as well). The male Peregrine and the Gyr Falcon, both three to four years old at the time, also fell ill during the same period. The Peregrine became very thin and the colour of its feet went pale before it started eating normally. Both of these birds later recovered, though the Peregrine moulted badly. Thus, of the five falcons present, the three young ones died and the two older ones recovered.

Specimen 144: *Falco peregrinus*

Biological data. Male; adult; body weight and measurements unknown.

History. Found dead on the ledge beside an eyrie on Lundy in the Bristol Channel on 4th June 1963. It was discovered by Michael Jones, then Warden of Lundy Field Society, and sent by A. P. Harman to the Nature Conservancy for analysis. The bird was presumed to be the male of a pair from this breeding haunt where no young have been reared since at least 1960. On analysis it was found to contain considerable quantities of dieldrin, heptachlor epoxide and pp'-DDE (table 1). There is a possibility that these levels are artificially high as the body was rather dehydrated.

Specimen 581: *Falco peregrinus*

Biological data. Female; adult; body weight 714 grams; wing 340 mm.; tail 162 mm., bill 25 mm.; tarsus 51 mm. State of moult: 1st-5th primaries O, 6th 4, 7th-11th N; 1st-3rd secondaries N, 4th 2, 5th-6th N,

7th 4, 8th-12th O; coverts, four most distal feathers N, rest O; tail, 6th and 7th N, 5th and 8th 2, 1st-4th and 9th-12th O; body, moult in progress over most parts.

History. Picked up on a road in a remote deer forest, apparently unharmed, near Alladale Lodge, central Ross, on 29th August 1964. Dr. James Robertson Justice of Spinningdale, Sutherland, who collected it, noted that it showed an inclination to feed but was unable to swallow. It died on the following day, the final collapse being very sudden. A considerable amount of greenish-grey mucus flowed from its beak and nares immediately after death. The body was sent to J. W. Macdonald, of the Veterinary Laboratory of the Ministry of Agriculture, Fisheries and Food, at Lasswade, Midlothian, for examination. He reported that it 'was in poor condition. There was ulceration of the lining membrane of the thoracic portion of the gullet which had perforated to produce pericarditis. Cultural examination of the heart wall showed the presence of the organism *Escherichia coli*. Although at the time of examination no foreign body could be detected, the ulceration of the oesophagus could be associated with an injury, e.g. by a sharp piece of bone. There were a few large roundworms in the abdominal air sacs.' These were later found to be *Serratospiculum* sp., probably *S. tendo*. After post-mortem examination the body was sent to the Nature Conservancy for analysis for organochlorine insecticides (table 1). On examination the plumage was found to be in good condition. There was no evidence of severe damage such as may be caused by a bird thrashing about on the ground. The preserved skin is at Monks Wood Experimental Station.

Specimen 592: *Falco peregrinus*

Biological data. Male; immature; body weight 13.5 oz. (383 grams); wing 264 mm.; tail 144 mm.; bill 19 mm.; tarsus 50 mm. State of moult not known. (From information supplied by J. B. Murray of the Royal Scottish Museum as the skin was not examined by us.)

History. Found by C. D. Haddow of Broughton, Biggar, Lanarkshire, on 4th September 1964. It was caught up in a hedge and was wearing a leather strap and bells on its leg. It was placed in an out-house where it took a few pieces of sheep's liver and a very small amount of grouse breast muscle. However, it was dead by 10 a.m. the following day. Mr. Haddow informed us that when alive it 'was quite frisky . . . but it was very thin and light'. Also that 'several people in this district had seen it and heard the bells during the fortnight prior to our finding the bird'.

George Waterston of the Royal Society for the Protection of Birds, Edinburgh, asked the Royal Scottish Museum to send us the body for analysis. The results (table 1) show a relatively small quantity of

dieldrin in the liver.

Our post-mortem examination confirmed the finder's opinion that the bird was light. No fat could be found and the weight of the breast muscles (both pectoralis major and supracoracoideus muscles of right and left sides) was only 10.7% of the total body weight. This is much lower than that of Specimen 712 below. The gizzard contained only a small quantity of coarse fur and one nematode. Nine nematodes were found in the gut. There was no sign of injury.

Specimen 712: *Falco peregrinus*

Biological data. Female; adult; body weight 757 grams; wing 350 mm.; tail 162 mm.; bill 23 mm.; tarsus 50 mm. State of moult: wings, tail and body showed no signs of moult; plumage generally in good condition with little abrasion at the tips of the primaries and tail feathers.

History. Found by T. J. Brenton of Trevarrian, near Newquay, Cornwall, on 17th March 1965. It was lying dead 'in an open cliff-top field about 30 yards from the cliff edge'. Mr. Brenton noted that the area has 'high sheer cliffs with plenty of wild pigeons'. We received the body in fair condition from the Royal Society for the Protection of Birds. Our examination showed that the feathers had apparently been chafed off the projecting humerus/ulna joint, particularly on the upper surface of the wing, leaving exposed skin. The head and mantle had a similar appearance. The right foot and distal joints of its toes were discoloured blue and brown, the toes being stiff and dry. This was in contrast to the left foot which was the usual dull yellow with the toes still soft and supple. When the body was skinned, numerous small contusions were found.

Internal examination showed a number of air sac worms apparently lying in the body cavity between the heart and the liver; also a considerable number of amorphous yellow nodules were found on and under the peritoneum. Both nematodes and nodules were sent to J. W. Macdonald for further examination. The air sac worms were later identified as *Serratospiculum* sp., probably *S. tendo* (similar to those in Specimen 581), and Mr. Macdonald informed us that he is sure that the severe damage done by these worms interferes with a bird's general health, especially when the heart sac (pericardium) is involved. Microscopic examination of the yellow nodules showed only amorphous material and it was not possible to give an opinion on their nature. The gizzard was found to be empty except for two stems of grass. The preserved skin is now at Monks Wood Experimental Station.

Specimen A: *Falco peregrinus*

We are indebted to J. Koeman of Utrecht University for the use of the analysis figures for this specimen (*J. Appl. Ecol.*, in press). The bird

BRITISH BIRDS

Table 2. Organochlorine residues in organs of birds of the
Residues are expressed in parts per million. Analysts are detailed
gas-liquid chromatography, and PC for paper chromatography.

Species	Dates obtained	Cause of death	No. of samples analysed	Tissue
Mallard <i>Anas platyrhynchos</i>	Nov 1963; Mar, Jun 1964	2 shot and 1 unknown	Mean of 3 1	Liver Fat
Moorhen <i>Gallinula chloropus</i>	Aug, Sep, Nov 1962; Mar (3) 1963; Apr 1964	5 road deaths and 2 unknown	Mean of 6 Mean of 6 Mean of 2	Liver Breast m Fat
Pheasant <i>Phasianus colchicus</i>	Jun 1963	Road death	1 1	Liver Breast m
Woodpigeon <i>Columba palumbus</i>				
Group 1	Jul, Sep (2), Oct 1962; Jan (2) 1963	Most found dead	Mean of 3 Mean of 6	Liver Breast m
Group 2 {	(b) Jan 1964	Found unable to fly	1 1	Liver Breast m
	(c, f) Feb (2) 1964	Road death and found dead	Mean of 2 Mean of 2	Liver Breast m

was in captivity at Amersfoort, Netherlands, and died in convulsions in February 1965. It was submitted to parasitological and pathological examination, but these were negative. The insecticide content proved to be large (table 1).

FOOD SPECIES

Birds of the same species as those used by Mr. Fiske to feed his falcons (page 52) have been analysed (table 2). The sample available consisted of three Mallards, seven Moorhens, one Pheasant and nine Woodpigeons. The majority were collected in south-east England during 1962-64 and were shot, road casualties or found dead.

All three Mallards and the single Pheasant contained very small residues. Only two of the Moorhens possessed detectable residues. The Woodpigeons fell into two groups: six had very small or no residues present in contrast to the other three (b, c and f) which all had high residues. One of the latter (b) was still alive when found, but unable to walk or fly.

Mr. Fiske also used a small amount of Hare to feed his falcons. Unfortunately there are no data available on the usual contamination

POST-MORTEMS OF FALCONS

those used as food for the Lanners *Falco biarmicus* in table 1
 EDGEMENTS on pages 62-63. GLC is an abbreviation for
 Woodpigeons are referred to in the text by the letters b, c and f

pp'-TDE	Dieldrin	Heptachlor epoxide	Gamma BHC	Other BHC isomers	pp'-DDT	Endrin	Analyst	Method
0.013	0.003	-	0.003	-	-	-	Shell	GLC
0.08	0.02	-	0.05	-	< 1.3	0.01	Shell	GLC
-	-	-	-	-	-	-	Nat Cons	PC
-	-	-	-	-	-	-	Gov Chem	GLC
-	-	-	-	-	-	-	Nat Cons	PC
-	-	-	-	-	-	-	Nat Cons	PC
0.1	0.04	-	-	-	0.1	-	Shell	GLC
-	-	-	-	-	< 0.05	-	Shell	GLC
-	-	-	-	-	-	-	Nat Cons	PC
-	-	-	-	-	-	-	Nat Cons	PC
-	8.00	?	-	-	-	-	Nat Cons	PC
-	9.00	-	< 0.2	-	-	-	Nat Cons	PC
-	3.50	1.10	0.40	-	-	-	Nat Cons	GLC/PC
-	0.07	0.07	0.01	-	-	-	Nat Cons	GLC/PC

of this mammal. However, it is unlikely to be any more contaminated than the bird species involved and probably has even lower residues. The residues in experimentally fed mammals are not as great as those in experimentally fed birds. Dale *et al.* (1962) found that the brains of laboratory rats *Rattus sp.* which had been given 200 parts per million of pp'-DDT in their diet for 90 days contained 6 to 21 p.p.m. (mean 9 p.p.m.) of pp'-DDT and no pp'-DDE. Bernard (1963), on the other hand, after including 200 p.p.m. of DDT in the diet of House Sparrows for 23 to 49 days, found a brain residue of DDT and metabolites amounting to 58 to 200 p.p.m. (mean 129 p.p.m.).

ORGAN WEIGHTS

As Peregrine 712 had not been examined before our dissection, we removed the organs whole, weighed them and calculated the percentage of total body weight. This allows us to calculate the total pesticide content of a particular organ. The weights and percentages were: breast muscles (both pectoralis major and supracoracoideus muscles of left and right sides), 132.66 grams (17.5%); liver, 23.37 grams (3.1%);

kidneys, 6.74 grams (0.9%); heart, 9.34 grams (1.2%). These percentages may be low owing to dehydration before examination.

If the relationship of organ weights to total body weight is similar in the Peregrine and the Lanner, these percentages can be used to calculate the organ weights of the Lanners for which we were unable to get measurements. In a male Lanner of 496 grams (the mean of the weights given by Woodford 1960) the liver would weigh 15 grams and the total breast muscle 87 grams.

The organ weights of one Woodpigeon (b) were also measured soon after death. They were breast muscle 125.12 grams and liver 18.33 grams.

DISCUSSION

The presence of considerable residues of organochlorine insecticides and the negative findings of the veterinary examinations make it likely that the two Lanners died of insecticidal poisoning. The fact that two of Mr. Fiske's falcons lived whilst three died does not necessarily invalidate this conclusion. Assuming all five had ingested similar quantities of insecticides, the older ones could have survived because of their greater resistance (DeWitt *et al.* 1960 showed that the sensitivity of Pheasants tended to decrease with age). Their subsequent recovery is in accord with published findings (Ash and Taylor 1963, Bernard 1963) that toxic residues can be eliminated if the birds are changed to an insecticide-free diet. The one-year-old Lanners also had additional stresses imposed by moulting and the young Peregrine by parasites.

Of the insecticide residues in the Lanners (table 1), the dieldrin and heptachlor epoxide are by far the most toxic. DeWitt *et al.* (1960) made comparative tests of the toxicity of 21 insecticides to Bobwhite Quail *Colinus virginianus*. They found the lethal dose to 50% of the subjects to be 35 milligrams per kilogram for dieldrin, 125 mg./kg. for heptachlor, 200 mg./kg. for gamma BHC and 500 mg./kg. for DDT. Thus dieldrin is respectively about four, six and 14 times more toxic than heptachlor, gamma BHC and DDT. There are no published data on the toxicity of DDE to birds. However, von Oettingen and Sharpless (1946) found it to have one-third of the oral toxicity of DDT to mice. Thus it is probably of little importance in birds when compared with dieldrin. Combining the two most toxic substances, dieldrin and heptachlor epoxide, we see that the amount of the combination present in the liver when death occurred was 5.3-7.5 p.p.m. (dieldrin 3.4-6.1 p.p.m.). The corresponding amount in the breast muscle was 2.7-3.4 p.p.m. (dieldrin 1.8-2.8 p.p.m.).

Comparing the organ contents of the wild Peregrines with the above Lanners, we see that Peregrine 144, found dead beside its eyrie, contained a combined residue of dieldrin and heptachlor epoxide of 5.5 p.p.m.; this is in the same range as the captive Lanners. Peregrine 712

also comes into the same category with a combined content of 5.2 p.p.m.; there is some support for the view that insecticides killed this bird as signs of damage to the body and plumage suggested the typical convulsions with it lying on its back. Peregrine 581 almost certainly died from pericarditis and the ulceration of the oesophagus which would make it difficult for it to feed; the combined residue was very low at 0.8 p.p.m. Peregrine 592 had obviously been taken, probably as a nestling, for falconry; its light condition indicated starvation, either through an inability to catch sufficient food or through being caught up by its jesses; again the combined residue was low at 2.0 p.p.m. Peregrine A almost certainly died of toxic chemical poisoning: the typical convulsions occurred and a veterinary examination could establish no other cause of death; the combined liver residue was high at 9.3 p.p.m. Thus in those cases where there was good presumptive evidence for another cause of death the residues were low, but where the cause of death was otherwise inexplicable the residues were high. Poisoning in the latter birds (i.e. 144, 712 and A) may be logically suspected. We have, therefore, an indication that the quantities of dieldrin and heptachlor epoxide in the livers of large falcons whose deaths may be correlated with apparent insecticidal poisoning lie in the range 5.2-9.3 p.p.m. (dieldrin 2.2-9.3 p.p.m.); the corresponding amounts in the breast muscles are 1.6-7.5 p.p.m. (dieldrin 1.3-7.5 p.p.m.). Peregrines 581 and 592 show that a liver content of 0.8-2.0 p.p.m. dieldrin and heptachlor epoxide (dieldrin 0.6-1.9 p.p.m.) may be carried by living individuals or ones dying from causes other than poisoning by insecticides.

It is possible that the mean lethal liver content is higher than the 6.6 p.p.m. shown by the above results and closer to the 9.3 p.p.m. of Peregrine A. First, there is the additional effect of the pp'-DDE (see below) and isomers of BHC present. Secondly, Peregrines 144 and 712 and Lanners 330 and 331 were under stresses of various kinds: Peregrine 144 was attempting breeding, 712 had a high parasitic load and both Lanners were in moult. This may have increased their susceptibility to toxic chemicals. There is also the indication that young birds are more susceptible than old ones.

The high pp'-DDE contents in the livers of Peregrines 144 and 712 have been ignored in the above analysis as it is very likely that this material was ingested as pp'-DDE (i.e. detoxication of pp'-DDT to pp'-DDE had occurred before the contaminated food was eaten). If pp'-DDT had been ingested one would expect at least a small amount of pp'-DDT or pp'-TDE to have been present in the liver at death (Jefferies and Walker in press). According to the published data (von Oettingen and Sharpless 1946, DeWitt *et al.* 1960), 70 p.p.m. DDE can only be equivalent to 1-2 p.p.m. dieldrin. This is supported by the

finding that 59.7 p.p.m. pp'-DDE plus 69.2 p.p.m. pp'-DDT in the liver of a Bengalese Finch *Lonchura striata* not only did not kill the bird but did not prevent it from breeding successfully (D. J. Jefferies, unpublished).

The work of Turtle *et al.* (1963) enables a comparison of the indicated susceptibility of the Peregrine to be made with that of its main prey species, the feral pigeon *Columba livia* (Ratcliffe 1963 stated that the feral pigeon forms 46% by weight of the Peregrine's diet in England, Wales and southern Scotland and 29% by weight in all British regions). Pigeons dying after being fed experimentally with dieldrin contained 6.2-32.0 p.p.m. in the breast muscle; those surviving contained 2.2-13.5 p.p.m. at sacrifice. Those dying after being fed with aldrin and heptachlor contained respectively 9.0-38.0 p.p.m. (as the metabolite dieldrin) and 19.0-53.0 p.p.m. (as the metabolite heptachlor epoxide) in the breast muscle. Thus we see that the large falcons are probably some four times more sensitive to organochlorine insecticides than these pigeons.

In the case of the Lanners the food species ingested were known and thus an idea of the rate of organochlorine intake may be estimated and compared with the content of the falcons. The insecticides present—dieldrin, heptachlor and gamma BHC—are most likely to have come from the commonly used cereal seed dressings via the four bird species used as food, i.e. Mallard, Moorhen, Pheasant and Woodpigeon. Analysis of a sample of twenty specimens of these four species obtained mainly in south-east England during 1962-64 (table 2) showed that in most cases the organochlorine content was very low. The Moorhens and most of the Woodpigeons were found to contain no dieldrin or heptachlor epoxide in the liver or breast muscle. Both the Mallards and the Pheasant had small residues of dieldrin in the liver, but there was none in the breast muscle of the Pheasant. Three of the Woodpigeons, however, contained organochlorines in amounts vastly greater (800 times) than that which may be taken as the normal background level for these four species. Ignoring these three birds at present, one can calculate the dose level of dieldrin and heptachlor fed to the Lanners, assuming they were given equal weights of the four bird species containing the normal background contamination. This level is found to be 0.01 micrograms (μg) per gram of liver and none in the breast muscle. This must only be considered an approximation, however, as some inaccuracies will arise from the unsatisfactory but unavoidable combination of paper chromatography and gas-liquid chromatography results, paper chromatography being less sensitive.

We have already noted that a male Lanner weighing 496 grams would have a total breast muscle of 87 grams and a liver of 15 grams.

If one takes these as being the organ weights of the male Lanner 331 and uses the residues from table 1, one can calculate that a total of 335 μg of dieldrin and 73 μg of heptachlor epoxide (408 μg in all) were present in the breast muscle plus liver. As the age of Lanner 331 is known (420 days), one can calculate the dose level of dieldrin and heptachlor in the food that this represents, assuming a complete accumulation of every μg ingested. Woodford (1960) noted that 'the daily ration for a Peregrine falcon will be about 5 oz. and for a tiercel rather under 4 oz.' As a male Lanner is smaller than both, a daily consumption of $3\frac{1}{2}$ oz. (99.22 grams) is probable. Thus food eaten at the rate of 99.22 grams per day for 420 days would have to be contaminated to an extent of 0.01 μg per gram (p.p.m.) to produce the residue level in the Lanner under the above conditions.

However, as normal background contamination of the usual food amounted to only 0.01 p.p.m. dieldrin in the liver and 0 p.p.m. in the breast muscle, we can see that a lethal residue of dieldrin could accumulate only if (a) the bird were fed completely on liver (b) all the insecticide accumulated were concentrated in the liver and breast muscle of the falcon and (c) there were complete assimilation of every μg of dieldrin ingested. These conditions make it improbable that the residue found arose from the normal background contamination of the food since (a) falcons are fed mainly on breast muscle (b) the liver plus breast muscle contents represent only a fraction, perhaps a half or two-thirds, of the total insecticide content of the Lanner and (c) it is very unlikely that every μg of insecticide ingested will be stored in the bird (Stickel *et al.* 1965 showed that only 16.3% to 20.0% of the heptachlor consumed via contaminated earthworms was absorbed by American Woodcock *Philobela minor*).

The most likely way, therefore, in which the lethal concentrations present could have been accumulated is by the consumption of a few highly contaminated birds such as the three Woodpigeons (b, c and f) containing levels 800 times more than the background (two of these were still alive at the time of being taken). Using the organ weights detailed above, it may be calculated that the first of these Woodpigeons (b) contained a total of 1,273 μg of dieldrin in the breast muscle (1,126 μg) and liver (147 μg). Even allowing that only 20% of the dieldrin is absorbed by the falcon, the liver and breast muscle content of Lanner 331 could have been absorbed by consuming the breast muscle of only two such pigeons. Assuming that these organs held two-thirds to a half of the total content of the falcon, three or four such heavily contaminated pigeons could prove lethal (Turtle *et al.* 1963 showed that feral pigeons may accumulate as much as 13.5 p.p.m. of dieldrin in the breast muscle and still survive, so it is possible that even these small numbers could be further reduced).

If these remarks are extrapolated to cover wild Peregrines, one may speculate that it was not so much a slow accumulation of toxic chemicals which produced the initial decrease in the British population, but a rapid build-up causing the death of a large number of individual Peregrines during the period when dressed seed was available to pigeons (Murton and Vizoso 1963 showed that Woodpigeons can pick up an L.D.₅₀ dose of dieldrin from dressed grain in less than five hours of feeding). It is possible that the effects of toxic chemicals are likely to be at their most obvious in a small population of a slow breeding species, such as the Peregrine, which is sensitive to small organochlorine residues and whose main prey species, the feral pigeon, is most resistant. This situation is probably made worse by the Peregrine taking the weaker and probably more heavily contaminated birds from out of the flock (Eutermoser 1961, Saar 1961). Similar results have been found with the Fox *Vulpes vulpes*, many of which died during 1960 and 1961, apparently from insecticide poisoning. Blackmore (1963) showed that the Fox is extremely sensitive to dieldrin, noting that insecticide poisoning can be suspected if more than 1 p.p.m. of dieldrin and more than 4 p.p.m. of heptachlor epoxide are found in the flesh. He attributed the deaths to Foxes eating the carcasses of Woodpigeons which had died after feeding on dressed cereal seeds (deaths occurred in experimental Foxes after consumption of three to six wild Woodpigeons found dead in the field).

Ratcliffe (1963) also showed that, as well as a 40% decline in the Peregrine population by 1961, only one-third of the survivors were breeding successfully. Thus there is also the possibility that sub-lethal residues, obtained from prey possessing low residues or from one or two prey with high residues, may also be affecting the population. (Some evidence that sub-lethal amounts of organochlorines can affect breeding success has already been shown for other species—DeWitt 1956, Post 1951; and Jefferies, work in progress.) Thus, if these sub-lethal residues did not, as has been suggested, cause the initial sudden decline in numbers, they could delay a recovery in the population.

These conclusions are unfortunately based on limited information, but the Peregrine is a bird of remote places and only very rarely are bodies obtained in a condition to allow detailed veterinary and chemical examinations.

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SUMMARY

An examination was made of the results available to date from analyses of a small number of wild Peregrines *Falco peregrinus* and some trained Peregrines and Lanners *F. biarmicus*. Three died in circumstances making it probable that organochlorine insecticides were responsible, two others from other known causes and two more from unknown causes. The residues present in those dying from other known causes was very much lower than in all the rest. It was concluded that all but these two may have died from organochlorine poisoning—probably from the effects of the combined residues of dieldrin and heptachlor epoxide, the two most toxic present. If this is correct, the lethal range is indicated by a residue of 5.2-9.3 parts per million (p.p.m.) in the liver.

An examination of the residues in wild individuals of the bird species fed to two trained Lanners considered to have died from organochlorine poisoning showed most to contain extremely small residues. However, a few Woodpigeons *Columba palumbus* contained very high levels. A theoretical calculation suggests that lethal residues could be obtained by the falcons ingesting a few highly contaminated prey rather than a large number of prey with small residues. Using figures available from toxicological experiments on feral pigeons *C. livia* (the principal diet of wild Peregrines), it appears that death could result from eating only three or four heavily contaminated birds. If this is correct, the sudden decline of the British Peregrine population might be explained to a large extent by individual falcons having taken a few pigeons which contained high residues, probably as a result of feeding on seed corn treated with organochlorines.

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British bird-photographers

6. H. G. Wagstaff

(Plates 9-16)

LIKE MANY OTHER naturalists, Hugh Wagstaff first became interested in birds through collecting eggs as a boy. In June 1908 he and two friends arranged to visit Anglesey during the nesting season and almost at the last moment another friend lent him a Sanderson half-plate camera. In Anglesey he made the acquaintance of a local chemist who

sold photographic equipment and under his instructions young Wagstaff used the dark-room for loading the plate holders and developing the negatives. He took photographs of the nests and eggs of Ringed Plover, Oystercatcher and various gulls and terns, and the results were so good that he proudly sent copies to his parents and friends. Although this was nearly 60 years ago, he can still remember the thrill of seeing the negative of a Ringed Plover's nest slowly build up in the developer, for in those days, before panchromatic plates, most negatives were developed with the aid of a dim red light.

Gradually it dawned on him that it was much more fun to take photographs than eggs and that he should attempt to obtain pictures of the birds themselves. With this aim in view he purchased a Sanderson half-plate stand camera of his own, which he later had adapted down to quarter-plate. To this was fitted a $7\frac{1}{2}$ -inch Reitzschell lens mounted in a silent pneumatic shutter.

Some photographers will always be remembered for particular pictures. Thus the name of A. J. Rooker-Roberts has long been linked with his magnificent pair of Golden Eagles *Aquila chrysaetos* at the nest; Ian Thomson with his pair of Montagu's Harriers *Circus pygargus*; Niall Rankin with his Gannet *Sula bassana* braking to land; John Barlee with his Kittiwake *Rissa tridactyla* in flight; and Colonel H. Morrey Salmon with his Herons *Ardea cinerea* at the nest. Similarly, there can be no doubt that Wagstaff will always be remembered for his outstanding photographs of Buzzards *Buteo buteo* at bait, one of which is reproduced here (plate 10).

To obtain this series of photographs meant a lot of planning, hard work and travel, but that is typical of Wagstaff's approach to bird-photography. He has never minded how much trouble the preparations involved, so long as the resulting photographs showed the birds completely at ease and behaving naturally. Before ever starting to put out bait he used to visit the locality many times, assessing the Buzzard population, studying their behaviour, where they did their hunting, where they were likely to be at different hours of the day and where they would build their nests. Then he selected a site for the bait, bearing in mind lighting and background and choosing a position where the feeding Buzzard could get a good view all around to allay fear of surprise. Next he constructed his hide, not using a portable one like most bird-photographers, but building his own on the spot with a framework of wood covered with heavy sacking. He made the roof of fine wire netting with a layer of sacking and then waterproof canvas on top, after which he thatched the whole hide with heather, bracken, grass and branches from the nearest trees so that it became part of the landscape. If the ground inside the hide proved suitable, he dug a hole so that he could sit on the floor with his feet inside it.

Wagstaff reckons that over the years he has used more than a thousand rabbits as bait, as well as hares, poultry, rats, moles and raw meat. About nine feet in front of the hide he pegged the bait down to prevent the Buzzard from dragging it off or flying away with it. Fresh bait was put down every three to four days, Wagstaff doing this himself at week-ends while a gamekeeper friend took over in mid-week. When entering or leaving the hide Wagstaff always had a companion to act as decoy and he considers this most important even when no nest is involved.

One such hide was kept going for over three years and Wagstaff frequently spent up to 36 hours at a stretch inside it, sometimes taking quite a number of photographs but often getting nothing. He says that it gave him indescribable satisfaction to have lured such a wary bird as a Buzzard to within nine feet of his camera. From such hides Wagstaff has photographed not only Buzzards but also Ravens *Corvus corax*, Carrion Crows *C. corone* (plate 11a), Magpies *Pica pica* and even a Stoat *Mustela erminea* (plate 11b). He also invited Ralph Chislett and T. M. Fowler to make use of one of these hides at bait and they too obtained some fine photographs.

The ambition of some bird photographers is to photograph as many species as possible in a single season, but Wagstaff has always concentrated on one species at a time, spending two, three or even four years photographing practically nothing else. Thus, in the early 1930's, he set his sights on the Merlin *Falco columbarius* and obtained some delightful series of several pairs. The males and females at two such nests are shown on plates 12 and 13. The latter is a typical ground nest, but the former shows an eyrie in the less conventional site of a disused Carrion Crow's nest. Although Merlins lay quite regularly in old crows' nests in Fenno-Scandia, this is much less common in Britain. Wagstaff deliberately set out to find such a nest to complete his series of this species. It is interesting to note that at this particular nest the male visited and fed the young even when they were quite large (plate 12a), whereas at none of the many ground nests he watched did he ever see the male come after the young were more than a few days old. Plate 13a shows the male at the ground nest covering the eggs.

It must be true to say that Wagstaff has photographed fewer species than most bird-photographers of his generation but that those he has photographed have been done more thoroughly and completely than by almost anybody else. Two such species are the Heron and the Rook *Corvus frugilegus* because treetop-nesters have always had a special appeal for him. Neither of these birds is represented in this series, but plate 15 shows a Raven at a tree nest. As in the case of the Merlin, it is less usual for Ravens to nest in trees in Britain than it is in parts of the Continent.

However, the birds of prey have always been his ruling passion and, in addition to the Merlins, he has photographed most of the British species at the nest. The present selection includes his unusual shot of a pair of Buzzards together (plate 9), a Peregrine *Falco peregrinus* (plate 14) and a female Sparrowhawk *Accipiter nisus* (plate 16a). The passerine counterparts of the birds of prey, the shrikes, are represented by a male Red-backed Shrike *Lanius collurio* (plate 16b).

Now retired, Wagstaff was by profession a works engineer and a director of a firm of machine-tool manufacturers in Coventry, where he was born in 1889. He was elected a Fellow of the Royal Photographic Society in 1932 and was awarded the Society's medal the following year. He was also elected to the Zoological Photographic Club in 1931. His many other hobbies include rugby football, hockey, entomology, gardening, walking and classical music.

ERIC HOSKING

Movements of British Robins as shown by ringing

By *D. W. Snow*

British Trust for Ornithology

LACK (1944) showed from analysis of ringing recoveries that British Robins *Erithacus rubecula* are partial migrants. Most of the winter recoveries he analysed were local, but a small proportion of the birds had migrated south to France. There was (and still is) no conclusive evidence from ringing that any Robins breeding in England or Scotland migrate to Ireland, though the possibility was not excluded. Earlier work (Lack 1940) had shown that most of those that migrate are females. In a subsequent paper (Lack 1948) he discussed the ecological aspects of Robin migration, and also presented a table which showed, from ringing recoveries, that a considerable proportion of young ones disperse to distances of several miles from their birth-place, but that once they have taken up territories they become much more sedentary.

The number of Robin recoveries has increased enormously since Lack wrote, and justifies a somewhat more detailed analysis of the long-distance movements. These are still far fewer than one could wish, but the annual increment is small and it will probably be many

years before anything like a complete account will be possible. It may be noted that many of the Robin movements mentioned by N. F. Ticehurst in *The Handbook of British Birds* cannot yet be substantiated from ringing recoveries; this applies especially to those involving Ireland and the west of Scotland.

METHODS

As we are concerned with the British population alone, only those records have been used which show that the bird was either born, or almost certainly breeding, in the British Isles. The following categories of recoveries have been examined:

- (1) birds ringed as pulli;
- (2) birds ringed as juveniles before the end of August;
- (3) birds ringed as adult or full-grown in April-July, except at south- and east-coast stations; and
- (4) birds ringed at other times of the year and recovered in a subsequent breeding season, except at south- and east-coast stations.

Clearly the first category is the only one for which the birth-place is known with certainty. Those in the second category are almost certainly British, since Continental Robins on passage do not normally arrive until September, and in any case are in first-winter plumage when they arrive. Their exact birth-place is less certain, as by July or August they may have moved some distance from it. There is in fact no evidence from ringing of a movement of as much as ten miles by the first August of life, but such movements may well be made, since by the second week of September some British Robins of the year have already reached France. The birth-place of those in the third and fourth categories is unknown, but they almost certainly belong to the British breeding population. It is essential to exclude adults ringed at south- and east-coast stations, as Continental Robins are on migration well into our breeding season. Since the Robins that occur at west-coast observatories are overwhelmingly of the British subspecies, distant recoveries of these have been examined; but, in fact, they are too few to throw much light on the west-coast movements.

In attempting to determine the proportions of Robins that are migratory or sedentary, it has been necessary to exclude all those recovered by the ringer at or near the place where they were ringed. Such recoveries would greatly exaggerate the apparent proportion of residents, as the ringer is so much more likely than anyone else to recover his own birds. All Robins caught and released by people other than the ringer, whether near where they were ringed or at a distance, are included.

The same regional divisions of the country have been adopted as



'LATE 9. Buzzards *Buteo buteo* (male at back), Breconshire, June 1937 (H. G. Wagstaff)
(pages 64-67)



PLATES 10 and 11. Predators at bait (page 65). Above, Buzzard *Buteo buteo*, Breconshire, October 1954. Right upper, Carrion Crow *Corvus corone*, Radnorshire, October 1937. Right lower, Stoat *Mustela erminea*, Radnorshire, October 1936 (H. G. Wagstaff)







PLATES 12 and 13. Merlins *Falco columbarius* at very different nests (male upper in both). Left, a less usual site in an old crow's nest, Breconshire, June 1939. Above and below, the more typical ground nest, Radnorshire, 1933 (H. G. Wagstaff)

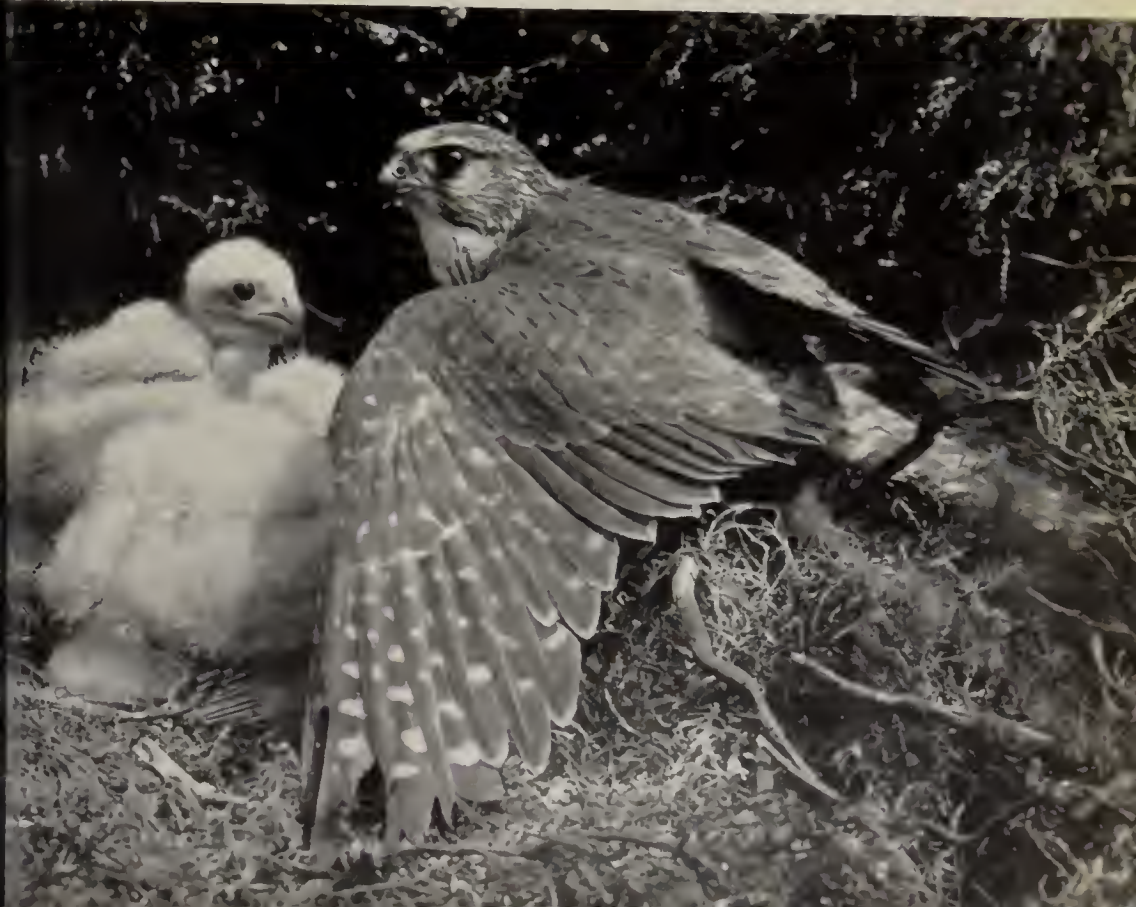




PLATE 14. Peregrine *Falco peregrinus*, Breconshire, July 1939 (H. G. Wagstaff)

PLATE 15. Raven *Corvus corax* at tree nest, Breconshire, May 1939 (H. G. Wagstaff)





PLATE 16. Above, hen Sparrowhawk *Accipiter nisus*, Warwickshire, June 1949. Below, male Red-backed Shrike *Lanius collurio*, Buckinghamshire, July 1936 (H. G. Wagstaff)





FIG. 1. Overseas recoveries of British Robins *Erithacus rubecula*. The Continental recoveries were ringed as young or (in one case) as an adult in the breeding season; the Irish recoveries were ringed on passage on the Calf of Man. Figures at the places of recovery indicate the months of recovery; those not underlined were in the following autumn or winter, those underlined once were in the next but one autumn or winter, etc. The Spanish recovery was from near Cordoba (off the map).

were used by Lack (1944): Scotland and the Borders (Northumberland, Cumberland, Westmorland and Durham), Northern England (Yorkshire, Lincolnshire, Nottinghamshire, Derbyshire, Lancashire, Cheshire and North Wales) and Southern England (all the counties to the south of these). There are still too few recoveries to warrant finer subdivision.

Lists of all distant recoveries (ten miles or more) are deposited at the British Trust for Ornithology and in the library of the Edward Grey Institute at Oxford.

MIGRATION TO THE CONTINENT

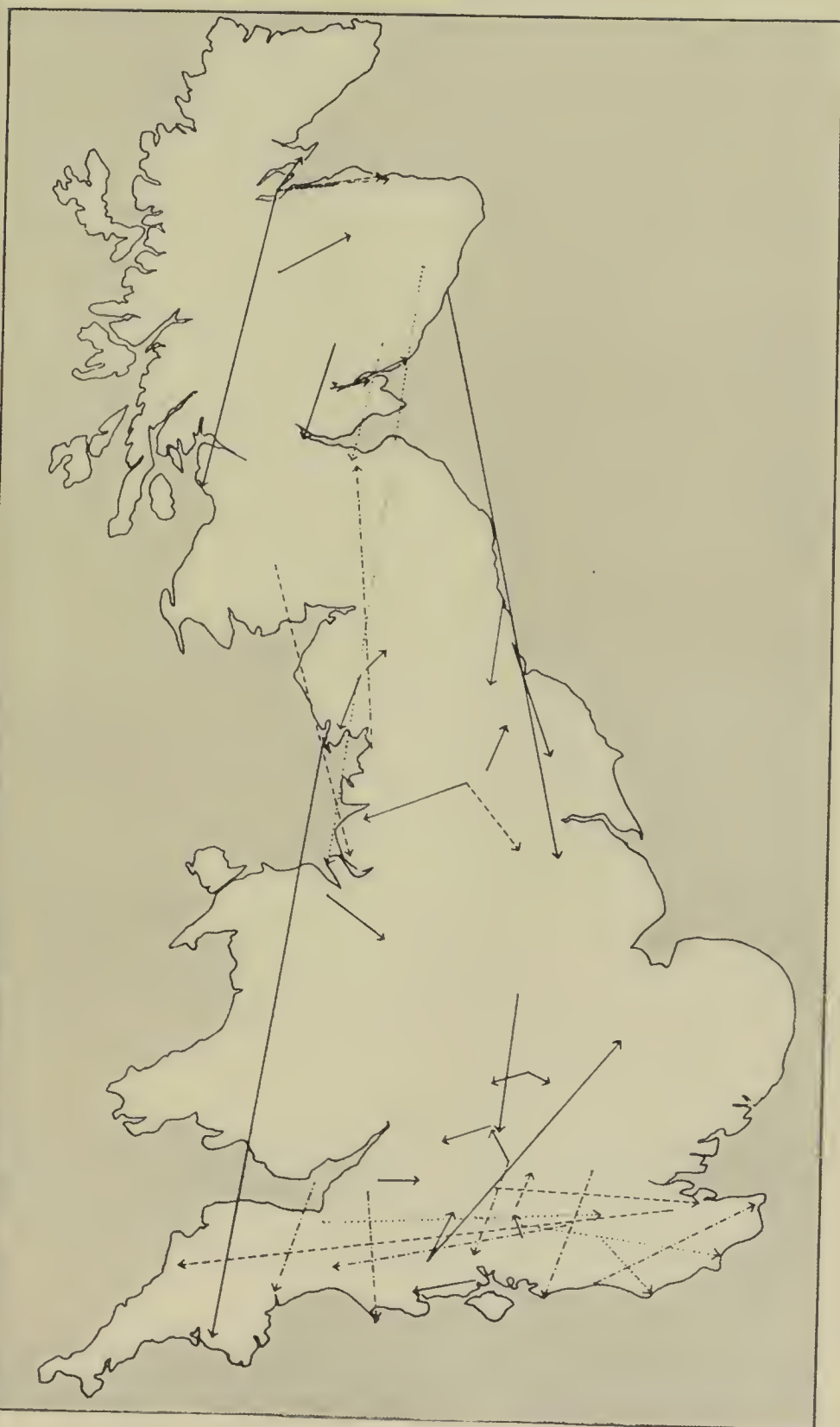
Five Robins ringed as nestlings, and five ringed as juveniles before the end of August, have been recovered in France (nine) or Spain (one), and one ringed as a nestling has been recovered in Holland. In addition, one ringed as an adult inland in the breeding season (21st July) has been recovered in France. As mentioned above, there is still no conclusive evidence that any Robins born in Great Britain migrate to Ireland, though this now seems very likely from recoveries of migrants ringed on the Calf of Man in August and September: four of these have been recovered in Ireland, three of them in the following winter—December to early March—and the fourth in a later winter (fig. 1).

Fig. 1 shows that the migrants to the Continent came mainly from the south, and especially from the south-east, of England, and that their recovery localities mostly lay between south and SSW of the ringing localities. Though the numbers are small, there appears to be a difference between the age groups. The six most southerly recoveries were all in their first-year, whereas the recoveries of older individuals were more to the north-east. Thus the extreme easterly recovery (Hook of Holland) was in its third winter; the next most easterly (Rouen) was in its fourth winter; and the age of the next (near Tours) was unknown, but it was not in its first winter as it was the only one ringed as an adult. Whereas five of the seven first-winter Robins were recovered in September (four) and October (one), the older ones were all recovered in November, December and January.

These records could be interpreted as indicating that adult Robins

FIG. 2 (*opposite*). Recoveries of British Robins *Erithacus rubecula* at ten miles or more within the country. Solid lines: ringed as nestling or juvenile and recovered in the following autumn or winter. Broken lines: ringed as adult in the breeding season and recovered in the following autumn or winter. Dots and dashes: ringed in autumn (August-September) and recovered in the following winter. Dotted lines: ringed in winter and recovered in the following breeding season (arrowhead in this case indicates the direction taken in previous autumn)

MOVEMENTS OF BRITISH ROBINS



follow a more easterly course than juveniles, but a more likely explanation is perhaps that all of them take a more or less south-easterly course across the English Channel, and that the heading is then changed to SSW—as in the Swallow *Hirundo rustica* (Davis 1965) and probably many other small passerine migrants (Lack 1963)—and that the adults tend to stop sooner and winter farther north, while the juveniles continue farther south, not stopping long enough in the north to give much chance of recovery.

LONG-DISTANCE MOVEMENTS WITHIN THE COUNTRY

All the recoveries that give some indication of the directions taken in autumn by migrants within Great Britain are plotted in fig. 2 (see fig. 1 for movements from the Isle of Man). The picture is confusing, with no simple pattern emerging, but the following trends seem significant. Recoveries of Scottish Robins tend to fall into two groups: those showing long movements in a southerly direction, and those showing shorter movements, of which six out of nine are in north-easterly directions and suggest an avoidance of the inland mountainous areas. There is only one long movement of a Robin known to have been born in the north of England, from Lancashire to Devon. It is difficult to account for the other long movement, from Lancashire (22nd September) to Midlothian (same November).

There is a marked lack of records involving Robins from the English midlands, which contrasts with the considerable number for southern England. Nearly all the longer movements in the south of England are orientated transversely to the north-south axis: five show movement to the east, and two to the west. Both of the latter were recoveries from hard winters (1961/62 and 1962/63), which suggests that Robins do make hard-weather movements—a debated point (discussion in Lack 1948), for which the evidence is still meagre. It may be significant that all the four records which show movement in a nearly southerly direction to the south coast of England were ringed in the autumn (August and September), and so were not necessarily southern English breeding birds. They may well have been on passage from further north when ringed.

There are six records (not shown on the map) indicating shifts in breeding locality between years. For instance, one ringed in July 1961 at Banbury, Oxfordshire, was recovered in July 1962 at Hemel Hempstead, Hertfordshire, 41 miles ESE. These shifts may well involve long-distance migrants which failed to return to their previous breeding locality.

WEST-COAST MOVEMENTS

As already mentioned, there is little evidence from ringing for the migrational movements on the west coast of Great Britain and the

Irish coasts summarised in *The Handbook*. Fig. 1 shows the five records of Robins ringed on the Calf of Man and recovered at a distance. Since Robins are overwhelmingly passage migrants on the Calf of Man, one may reasonably interpret these records as indicating that some from southern Scotland and northern England winter in Ireland; but it is curious that ringing on the Calf of Man has produced these records in four years, whereas ringing in England and Scotland for 55 years has not yet produced any.

Three Robins ringed on Great Saltee, Co. Wexford, in late August and September, when there is an annual influx, have subsequently been recovered on the mainland of Ireland. Two were recovered in a later breeding season (Co. Dublin, about 1st May; Co. Louth, 20th June); the third was first reported in early January and recorded as still present on 2nd May (Co. Kerry). These records indicate that Irish breeding Robins migrate south, but the winter quarters of these migrants offer a problem, since only a small number can winter on the Saltee Islands themselves.

THE PROPORTION OF THE POPULATION MIGRATING

In his study area in south Devon, Lack (1940) found that nearly all the males were resident; 70% of the females apparently migrated, but some certainly moved only short distances and, since they returned in January and February, they may all have spent the winter within a few miles. At the other extreme, Robins normally leave some breeding areas at high altitudes in Scotland completely, and all must move several miles at least. The proportion of the population migrating, as assessed from ringing recoveries, can therefore at best be only a very rough average figure.

Table 1 sets out the numbers of local and distant recoveries in autumn and winter for the three regions into which the country has been divided. Altogether, 6% of the Robins born in Southern England were recovered abroad, and another 4½% at distances of ten miles or more within the country. The figures for the two northern

Table 1. Recoveries during September-February of Robins *Erithacus rubecula* ringed as young in the three main divisions of Great Britain (page 70)

Where ringed	Recovered locally	Recovered at 10 miles or more in Great Britain	Recovered abroad
Scotland and Borders	27	6	1
Northern England	50	3	1
Southern England	143	7	10

regions combined, though rather small, leave little doubt that relatively fewer Robins from the north of the country migrate abroad (altogether two out of 88, or $2\frac{1}{4}\%$), though more of them move to a distance within the country (altogether nine out of 88, or 10%).

In spite of the fact that local recoveries by the ringer have been excluded, the chances of recovery of a Robin which remains near where it was ringed must still usually be better than the chances of one that migrates away, since so many are ringed in suburban areas where dead Robins are more likely to be found, and if found reported, than in rural areas or abroad. Hence the totals of about 10% and 12% given above for the migratory fraction of the population are probably too low, and may well be much too low.

ACKNOWLEDGEMENTS

I am grateful to Robert Spencer and Peter Davis for helpful criticism of this paper in an earlier draft, and to the staff of the B.T.O. Ringing Office for help in checking and locating some of the records.

SUMMARY

The long-distance ringing recoveries of British Robins *Erithacus rubecula* are shown on two maps. A proportion of the population, mainly from the south-east of the country, migrates south to the Continent. The records, though few, suggest that older individuals migrate less far than first-year ones, and that the direction of migration is perhaps south-east to northern France and then SSW to south-western France and the Iberian peninsula.

Long-distance movements within Britain present a more confusing picture. Scottish Robins tend to move either long distances to the south or shorter distances in directions which suggest avoidance of mountainous areas. Southern English ones tend to make their longest journeys in west-to-east or east-to-west directions, the latter (only two records) indicating hard-weather movements.

Ringing still throws little light on west-coast movements, but recent recoveries in Ireland of Robins ringed on migration on the Calf of Man suggest that some from north Britain winter in Ireland.

The apparent proportions of migrants to non-migrants for three divisions of the country, as shown by ringing, are set out in a table. It is pointed out that the true proportions of migrants may be considerably higher than these figures indicate.

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Notes

Swifts roosting on poles.—At dusk on 4th September 1965, near the field station on Walney Island, Lancashire, J. Wilson, B. Sutton and I saw a Swift *Apus apus* repeatedly fly at a telegraph pole and then eventually land on it. It apparently settled there and soon afterwards our attention was drawn to another Swift on top of the flag pole at the field station. In his book *Swifts in a Tower* (1956) Dr. David Lack described various roosting habits of this species, but made no mention of poles in this connection. These Swifts were, of course, on migration and it might be added that some two hours after dark there was a torrential rainstorm.

W. H. TICKLE

Ringed Plover trapped by cockle.—On 30th August 1965, at Pagham Harbour, Sussex, I saw a Ringed Plover *Charadrius hiaticula* standing on the mud with its head down. It did not move as I approached from behind and, on picking it up, I found a large cockle *Cardium edule* firmly closed over the distal third of its upper mandible. I had to twist a penknife blade between the valves of the cockle to get it off. The Ringed Plover, which was in first-winter plumage, was apparently unharmed and when released flew about 75 yards, landed and proceeded to preen. It remained in the same place for about five minutes and then flew away across the harbour. If the cockle had maintained its grip until the next high tide, the plover would presumably have drowned as it was standing well below the high water mark. It seems worth adding that *The Handbook* does not record cockles among the food of the Ringed Plover.

T. G. WINTER

[An earlier note by J. Hori (*Brit. Birds*, 55: 443-444) recorded several wader species being trapped by cockles and also mussels *Mytilus edulis*. These included Redshank *Tringa totanus*, Oystercatcher *Haematopus ostralegus*, Knot *Calidris canutus* and Grey Plover *Charadrius squatarola*. In this same note Mr. Hori summarised observations showing how easy it is for cockles to attach themselves to the bills of waders trying to feed on them and the methods used by the waders to dislodge the bivalves in such cases. Another record of this kind involving a much less likely predator of cockles is published below.—EDS.]

Tern trapped by cockle.—On 23rd May 1965, at Newtownards Airport on the shores of Strangford Lough, Co. Down, W. Maxwell and B. McCullough saw a bird flying in an unusual manner. It was hovering about three feet off the ground for short periods and then alighting. They caught it quite easily and found that it had a cockle *Cardium edule*



FIG. 1. Tern *Sterna* sp. with cockle *Cardium edule* attached to its lower mandible, Co. Down, May 1965 (photo: B. McCullough)

attached to its lower mandible. The bird was a tern with a red beak and, from Mr. Maxwell's description and photographs taken by Mr. McCullough (fig. 1), must have been either a Common Tern *Sterna hirundo* or an Arctic Tern *S. macrura*, probably the former. The cockle was so heavy that the tern's head was literally stretched downwards when it tried to fly. It was prised off with some difficulty and the tern then flew away strongly, calling loudly, which seemed to indicate that its predicament had been of short duration. Strangford is a salt water lough and the receding tide uncovers many square miles of sand on which cockles are plentiful. Perhaps the tern had settled on the sand and idly pecked at an open cockle near it, because this does not seem to be a recorded food of these birds. R. JOHNSTON

Birds attacking lizards.—K. A. Ray's note on a Starling *Sturnus vulgaris* taking lizards to its young (*Brit. Birds*, 58: 439) prompts me to summarise my observations on avian predation of Sand Lizards *Lacerta agilis* and Common Lizards *L. vivipara* in the coastal sand-dunes of south Lancashire during the years 1962 to 1964 when I spent one or two days each week in that area. All my records refer to juvenile lizards—Sand Lizards hatched from eggs in late August or early September and Common Lizards born viviparously during July or early August—and I have no evidence of birds offering lizards to their young.

On sunny days in September and October juvenile Sand Lizards

often bask in relatively bare sandy areas, usually in groups close to the clutch site. On one occasion in 1963 I watched one or more Mistle Thrushes *Turdus viscivorus* and a Robin *Eritbacus rubecula* attacking Sand Lizards at various times between 8 a.m. and 10 a.m. GMT. Each of these predatory species was successful only once, the Mistle Thrush immediately flying off with its victim and the Robin pausing to beat the lizard into immobility against the sand before flying away. Both species attempted to grasp lizards behind the forelegs on all observed occasions; a Sand Lizard dropped by a Mistle Thrush and examined for injuries displayed a patch of torn epidermis on each flank 3 mm. to 8 mm. behind the posterior angle of the forelegs and no other apparent damage. Similar injuries, which I had also noted on juvenile Sand Lizards in 1962, persisted as dark patches on marked lizards of both species through most of the following season despite periodic sloughs of skin. Juvenile lizards seem much less prone to autotomy of the tail than older ones: those that I saw attacked by birds, and nearly all the others that I observed and caught, had undamaged tails.

One day in 1964 one or more male Blackbirds *T. merula* carried off three Sand Lizards and one Common Lizard. Although the numbers of the two species were approximately equal in the study area during 1962-64, the more prolonged basking of the young Sand Lizards made them seem commoner and they were therefore more vulnerable to bird predators. Like the Mistle Thrush in 1963, the Blackbird(s) made no attempt to kill any lizard before flying off with it; but on each occasion I was watching from within ten yards and the bird concerned may have been conscious of my presence. At the time of year when these observations were made juvenile Sand Lizards in south Lancashire vary in length between 60 mm. and 85 mm., and weigh about 2 grams; young Common Lizards are longer and heavier at 60-100 mm. and about 3 grams.

Although Kestrels *Falco tinnunculus* and Magpies *Pica pica* regularly hunted the same area and I saw them catch grasshoppers, I have no record of their taking lizards at any time in the three seasons.

C. SIMMS

[Since this note was received, we have also published a record of a Song Thrush *Turdus philomelos* attacking and killing a lizard (*Brit. Birds*, 8: 513).—EDS.]

Blackbird feeding young on dead leaves.—On 28th May 1964, in a wood at Denby Dale, Yorkshire, loud *ttst-tisit-tsit* calls drew my attention to three almost full-grown young Blackbirds *Turdus merula* being fed by an adult male for at least ten minutes on the previous

year's leaves of sycamore *Acer pseudo-platanus*. The adult was stuffing these fallen leaves as fast as possible into the young birds' open begging gapes. Often he would take some out again and then push them back in a more closely packed form or even transfer them to one of the others. Some leaves appeared to be swallowed immediately, especially by one of the young, but many were 'spat out' on to the ground, whereupon the adult would pick them up again and thrust them back into one or other of the open gapes.

I was watching from a distance of about thirty yards through binoculars and made quite sure that it was the dead leaves which were being fed to the young rather than any other vegetable or animal matter among them.

P. G. R. BARBIER

[Derek Goodwin suggests that this behaviour may have been due to some conflict in the mind of the adult. Blackbirds often peck at dead leaves, pick them up and throw them about when in a state of apparent nervous tension and he recalls a tame Jay *Garrulus glandarius* which was upset by his watching it when it was gathering fibres for its nest and which suddenly began to treat the fibres as food to be hidden, making a ball of them and burying them.—EDS.]

Blue Tit feeding mate with snail shell.—On 14th May 1951, in our garden near Manningtree, Essex, I was looking out through the window of a shed when I saw a Blue Tit *Parus caeruleus* clinging to a trellis only about four feet away and pecking at a round white object which it held under one foot. In view of what subsequently happened, I assume that the bird was a male. Having got a beakful of small white pieces from this object, he called to his mate who immediately flew to him from their nest in a box near-by. He then fed her with the pieces and they afterwards flew off together, he dropping what was left of the object. I went to pick this up and found it to be a small, old and chalky snail shell. Perhaps its addition to the female's diet would assist in the formation of shell for her eggs. I am quite certain that it was the shell itself which was being fed to the presumed female, and not invertebrates or anything else from inside it.

MARY G. TURNER

[There seems no doubt that the shell itself was being eaten. Derek Goodwin comments that the waxbills (*Estrildidae*) in his aviaries eat old snail shells as readily as they do egg shells. It is often not realised that birds consume much mineral matter for its own sake, not just as 'grit' for grinding. The most interesting part of Miss Turner's observation above is that the male fed the female with material of this kind.—EDS.]

Reviews

Fair Isle and its Birds. By Kenneth Williamson. With 'A List of the Birds of Fair Isle' by Peter Davis. Oliver & Boyd, Edinburgh and London, 1965. xvi+311 pages; 27 photographs (16 plates); 17 text-figures and maps. 30s.

Over 60 years ago Dr. William Eagle Clarke first visited Fair Isle and proved what a good place it is to study migration and see rare birds; he had picked it from a map, for almost nothing was known of its birds up to that time. In 1948, through the enthusiasm of George Waterston who bought the island, Fair Isle Bird Observatory was launched. The prospectus map showed migration theory very much where Eagle Clarke had left it, with streams of migrants following narrow lanes from the north-west and north-east down either side of Scotland, and Fair Isle sited at the main junction. Kenneth Williamson, the observatory's first warden, soon changed this concept and much else besides. A far better understanding of the patterns of bird movements was developed; traps and note-books replaced the gun (after some slight hesitation); and papers in the *Fair Isle Bird Observatory Bulletin* and elsewhere quickly restored the island to the pre-eminent position it had attained 40 years earlier.

Fair Isle and its Birds now summarises everything in one place in a most readable form. Part I is about the island, its people, its past, and the breeding birds. The general chapters evoke many memories: surely everyone who goes there must fall in love with the place. One wishes that this section were far longer, for there is so much still to be recorded about life on Fair Isle.

It is a pity there is no map of the island in the book, especially in view of the obvious pleasure with which local names are used. Readers will have to get a copy of Peter Davis's excellent map (6s. 9d. from Fair Isle Bird Observatory) or else rely on the fine series of photographs by John Peterson (but they will not get the view on page 160 from *The Good Shepherd* unless the boat is tossed well up the hillside). Curiously, also, the list of 'Selected References' does not include all those cited by author and date in the text, so that one is left guessing where to go for further information.

Chapters on the breeding birds cover work on the Fulmar and various other species, but especially the important population studies of Arctic and Great Skuas. Almost every Arctic Skua was colour-ringed and this revealed fascinating information on fidelity and divorces in the population, neatly shown by ingenious diagrams.

Part II is about migration. The author disarmingly agrees that not all his ideas are universally accepted. Downwind drift is discussed in

relation to the pattern of arrivals at Fair Isle from Europe, Greenland, Iceland and elsewhere, with the customary weather maps. Individual species, migration weather, vagrants, overshooting and other topics are covered, and these chapters give a most useful general summary of many aspects of migration.

Peter Davis, who took over when Kenneth Williamson left in 1956, contributes Part III—a very detailed systematic list of the birds of Fair Isle to the end of 1964, revised from the list published in the observatory *Bulletin*. No fewer than 284 full species and many races are admitted, and a further eleven mentioned in square brackets. Many old records have been rejected for lack of descriptions, but, where the species is not square-bracketted, it is (tactfully?) not always made clear whether birds 'reported seen' should likewise be ignored. The best of the island bird-watchers have an easy familiarity with splendid rarities like the Pechora Pipit, but science demands more—once a skin: now a written description.

Except for the winter months, the species summaries are based mainly on 17 years of daily observation and, even for races, give a model statement of average and extreme numbers at each season, normal and extreme dates for migrants and breeding birds, and changes in status over the years. This is by far the most extensive and precise information available on the dates of migration in Scotland and is of much more than local interest.

This book offers something for everyone and should find a place on every ornithological bookshelf.

ANDREW T. MACMILLAN

Avifauna Svalbardensis. By Herman L. Lovenskiold. Norsk Polarinstitutts Skrifter no. 129, Oslo, 1964. 460 pages; 18 plates incorporating 12 monochrome and 16 colour photos; 1 general and 33 distribution maps. N.Kr. 44.

Dr. Lovenskiold's long-awaited *Avifauna Svalbardensis* succeeds A. Koenig's *Avifauna Spitzbergensis* (1911) as the standard work on the Norwegian arctic islands, excluding Jan Mayen. The intervening half-century has been rich in exploration and discovery, in faunistic changes resulting from human agency and climatic variation, and particularly so in publication of books and papers. In H. T. L. Schaanning's 'Bibliotheca Ornithologica Norvegica' (*Norske Orn. Tidsskr.*, 1925: 57-131) only 168 items relating to Svalbard were listed from 1598 to 1924. By comparison, Dr. Lovenskiold catalogues, with useful annotations, no less than 631 books and papers up to 1958, and has drawn material also from trappers' diaries written between 1896 and 1940 and from other unpublished sources.

The extent of the bibliography gives an indication of the scope and

value of his work, although it does appear that, from some of the later papers at any rate, the abstracting of records has not been as thorough as would be expected. This criticism aside, however, *Arifama Svalbardensis* will undoubtedly remain the standard reference for many years to come, and serious workers on arctic ornithology would be well advised to obtain copies while stocks are available.

The main section of the book summarises practically everything which has been recorded on the distribution, movements, food and breeding of the birds of the area, while the introductory chapters, especially the one on climatic conditions and their influence, are of importance in considering the birds of Svalbard in relation to the whole western Palearctic region. In this connection, Bear Island must be considered separately from Spitsbergen as over 200 kilometres of sea lie between their nearest points; consequently, the increase in breeding species on Bear Island has taken place almost exactly ten years ahead of that on the latter.

Up to 1920 seventeen species are known to have bred on Bear Island, with an addition of nine species—no less than 50%—between 1920 and 1958. It is not surprising that Common, Herring and Great Black-backed Gulls are among these, and a record of interbreeding between Herring and Glaucous Gulls is quoted. Reports elsewhere suggest that this is occurring in Iceland also, but more unexpected is Dr. Lovenskiold's observation of interbreeding between Black-throated and Great Northern Divers, also on Bear Island. There is no previous breeding record there for the Black-throated Diver, and in these two cases we seem to have a parallel with the inter-breeding of Capercaillie and Black Grouse which occurred frequently during the Capercaillie's extension of range, and possibly also the explanation of the various unidentifiable white gulls which have been appearing in recent years in the north of Scotland.

In Spitsbergen twenty-six species are known to have bred before 1930, when the Great Black-backed Gull was found breeding, and eight more up to 1958. Several pairs of Herring Gulls were almost certainly breeding in 1950, with no evidence of hybridisation so far, but this is a species which will be worth careful observation in future. The Glaucous Gull is the universal scavenger and predator. Dr. Lovenskiold advocates control measures in the interests of other species, particularly the Eider which, following drastic depopulation due to persistent human plundering, is now hindered from recovery by the predation of Glaucous Gulls.

The maps, which are excellent apart from the omission of some recent records as already noted, are carried loose in a pocket inside the back cover. By present standards the book is cheap at the price (although any copy in regular use will require binding) and it is alto-

gether a first-class compilation without which no European ornithological library will be complete.

IAN D. PENNIE

Birds of Town and Village. By W. D. Campbell. Illustrated by Basil Ede. Country Life, London, 1965. 154 pages; 36 coloured plates. £6 6s.

The justification for this book is said to be twofold. One of the main objects is the portrayal of a sample of the birds to be found around our dwellings 'as seen by a sensitive eye and recorded by a gifted hand'. There is thus an aesthetic purpose, but at the same time it is hoped to be a guide to the identification of some of our commonest birds and to stimulate interest in their habits and behaviour.

The text consists of a short section on haunts, appearance, voice, food and nesting, especially in relation to man and gardens, with a few more general notes on some of the characteristics of each species, in which the author draws freely and attractively on a fund of personal lore. When the price is considered, however, it is obvious that, pleasing and accurate though the text is, the book cannot be expected to have any general appeal and it must be judged rather as a vehicle for the publication of the artist's paintings.

In the old style of pictorial illustration of birds, in full breeding plumage, Mr. Ede is quite successful. The settings are not unattractive, the portrayal is quite accurate and some of the spirit is caught, yet the whole is still artificial by modern standards and reminiscent of the museum exhibit rather than of what one sees in the field. It is doubtless no fault of the artist that either the block-makers or the printers have let him down wherever greys or greyish-greens should be depicted by making them far too greenish, with the result that for some species the colouring may well mislead the uninitiated for whom the book is supposed to be intended.

While one may ask whether there is really room today for such books as this, it is attractive, well-produced and would make a pleasant addition to a large library for those who can afford it. R. C. HOMES

Letters

Puffinosis among Manx Shearwaters

Sirs,—In his paper describing the virus disease, puffinosis, among Manx Shearwaters *Procellaria puffinus* on Skokholm, Pembrokeshire (*Brit. Birds*, 58: 426-434), Dr. M. P. Harris discusses the epizootics of 1962, 1963 and 1964. I was present throughout those of 1963 and 1964 and also during the same period in 1965, and should like to add some comments in the light of observations made in this last season.

In 1965 the disease hardly reached the status of an epidemic, affording a striking contrast to the dramatic effects of 1964. Indeed, the incidence was so small that it was not possible to undertake a quantitative investigation that would have had any statistical validity. Infected shearwaters were first noted on 1st September, and were largely restricted to Half-way Wall, the Hills, Garden Rock and a wall running parallel with the track along the south-western edge of South Haven. The worst-affected area was Half-way Wall, from North Pond south to Garden Rock. Only one infected bird was found on Medicine Wall, which was one of the hardest-hit sites in 1964.

As described by Dr. Harris, the disease is usually recognised by blisters on the feet; an extreme example, found in 1964, is shown in fig. 1. Dr. Harris also mentions conjunctivitis, spastic extensions of the feet and paralysis as other symptoms. In 1965 the outbreak was characterised by the high incidence of paralysis and extension of the legs, with relatively little blistering. One individual showed no blisters or spastic extensions, but was completely paralysed except for slight rotation of the head, and showed no blinking reflex when the eyes were gently poked. Further, several partly paralysed birds were found in the dense Main colony where puffinosis has not previously been recorded. The occurrence of so many showing paralysis but no sign of blisters even led to the tentative suggestion that more than one disease might be involved. As the disease, where characterised by blisters, spreads so rapidly through such colonies as Half-way Wall, it would be expected to spread even more quickly in the Main colony, where density is greatest; yet paralysis was found in only a few birds in the Main colony and showed no sign of spreading there.

As regards the mode of infection, Dr. Harris points out that walls and rocks where the chicks congregate to exercise their wings probably spread the disease by contact with the fluid from burst blisters, and he further notes that this would explain the absence of the disease in the dense Main colony 'where the soil is very soft and the vegetation extremely short'. In fact, the Main colony is bordered on the south



FIG. 1. Blistered foot of Manx Shearwater *Procellaria puffinus* infected with puffinosis, Skokholm, Pembrokeshire, 1964 (from a photograph by the author)

by a long, near-vertical ridge known as Wall Rock which is used by the fledging chicks in the same way as walls and rocks are used in areas where the disease is at its most widespread; yet no chick with blisters has been found in the colony. Thus it seems unlikely that the disease is transferred to any significant extent in this way; or, alternatively, paralysis and blisters are distinct and not transferred by the same means.

Dr. Harris's suggestion that the Oystercatcher *Haematopus ostralegus* chicks with blistered feet were suffering from puffinosis raises the question why the disease only affects shearwater chicks in the latter half of the fledging season. If the disease is 'around' to affect Oystercatcher chicks in June and July, why are shearwater chicks fledging in the last two weeks of August not infected? It might be worth adding that in the third week of July 1964 an Oystercatcher chick with these symptoms died in an area north of the Main colony (Tabernacle Rock) where puffinosis has not been recorded in shearwaters.

A. W. DIAMOND

Sirs,—Dr. M. P. Harris suggests that puffinosis among Manx Shearwaters was probably overlooked on Skokholm between 1947 and 1962, but this was not the case. Annual outbreaks certainly occurred during 1954-56, when I was warden there, and in the last of those years (following a very wet summer) considerable numbers of affected shearwaters were seen. I recall mention of the disease by the previous warden, Peter Conder, shortly after my first arrival on the island, and had the impression that such epizootics were an annual event in the years before 1954, as no doubt they have been ever since 1956.

During the 1950's, and earlier, the number of rings available for use on shearwaters on Skokholm was strictly rationed by the purse and, since the ringing of sick birds seemed 'wasteful' and, as now, was forbidden by the ringing regulations, it was our practice to avoid catching shearwaters late in the season along the walls and in the bracken where the disease appeared to occur most frequently. These areas were much the same as those now defined by Dr. Harris, though I do recall seeing a few cases on the west side of the island, in the areas north and north-east of the Main colony, probably in 1956.

Dr. Harris mentions the occurrence of this or a very similar disease in two young Lesser Black-backed Gulls *Larus fuscus*. I do not remember seeing any similar cases on Skokholm, but on Fair Isle between 1957 and 1963 there were annual outbreaks among Herring Gulls *L. argentatus*, and in several years among Great Black-backed Gulls *L. marinus* and Lesser Black-backed Gulls also. All were juveniles, and all were noted late in the summer, in August and September. Most were recorded from a party of young gulls which gathered each summer near the bird observatory and fed upon kitchen-waste thrown over a

low cliff into South Haven. These gulls would spend much of each day standing about on the short turf at the cliff-edge, and would roost in calm weather on the sea in the haven. Some were caught in clap-nets, but this was soon regarded as unprofitable as a steadily increasing proportion of them were evidently sick, with extensive blistering on the webs (but no conjunctivitis). Several of those ringed while apparently still healthy were later found dead or dying in the vicinity, often on the tide-line in South Haven, and a good many unringed ones were similarly noted. In two years, 1958 and 1963, considerably more were affected than in the other five autumns of my time on Fair Isle. Breeding-success had been exceptionally high in 1963.

I do not recall seeing blistering of the webs in any other sea-birds except the Shag *Phalacrocorax aristotelis*. In at least two seasons on Fair Isle late young Shags still in the nest were affected by this condition, and in 1963 there was a high incidence of the disease, which apparently caused some deaths, at a colony on the north coast of the island. Many of the nests there are in close proximity, under huge boulders, and several adjacent broods of well-grown young were affected in July.

PETER DAVIS

News and comment

Edited by J. L. F. Parslow

Ornithological news from the U.S.S.R.—The 4th All-Union Ornithological Conference, held in the beautiful central Asian city of Alma-Ata, Kazakhstan, U.S.S.R., from 1st to 7th September 1965, was attended by 263 delegates, three of whom came from western countries—one from Denmark and two from the United States. One of the latter, Ralph S. Palmer, has written to tell us of the wonderful hospitality he received from the Russians, and we are grateful to him for sending us a copy of the conference programme and other recent Russian ornithological news.

The programme itself presents impressive evidence of the wide-ranging interests of ornithologists in Russia today. In addition to the main symposia which occupied the first three days, there were more than 300 separate demonstrations or reports on the results of recent ornithological research, ranging from systematics, physiology and parasitology to migration, distribution and ecology. At a business session a resolution was passed requesting the government authorities to allow more Russians to participate in the forthcoming International Ornithological Congress at Oxford, to which the Russians hope to be able to bring an invitation to have the 1970 International Congress in Moscow.

Two forthcoming Russian publications will be of considerable interest to western ornithologists. A committee has been set up to prepare a check-list of the birds of the U.S.S.R. to be ready for distribution at the next All-Union Conference to be held in 1969 in either Moscow or Leningrad. The second publication is a field guide to the birds of the U.S.S.R. We understand that Dr. V. Flint and others have already completed the text and illustrations for this, 'the problem now being to get it published in a satisfactory manner'. Such a book, if approaching the same high

standards of the American and European field guides, would seem assured of a wide sale on both these continents as well as in the U.S.S.R. itself and in Asia as a whole. It is to be hoped that not only will the Russian field guide be published soon but that an English language edition will follow shortly afterwards.

Permanent Scottish Research Unit for Wildfowl Trust.—Hugh Boyd, resident biologist at the Wildfowl Trust's headquarters at Slimbridge for the past 15 years, has recently moved to Edinburgh (77 Morningside Drive, Edinburgh 10). He, and an assistant soon to be appointed, will form the Trust's permanent research unit in Scotland. Besides greatly facilitating Mr. Boyd's own work on goose populations, this new arrangement will enable the Wildfowl Trust to take part in research projects connected with the Loch Leven Reserve and with the International Biological Programme. The new unit will operate in close collaboration with the Nature Conservancy's Scottish Office.

The National Cage Birds Show.—To the average field-ornithologist there is always something rather depressing about the sight of thousands of birds, however unusual and exotic, cooped up row after row in the tiny show cages at the National Cage Birds Show held annually each December in the dreary Empire Hall at London's Olympia. Even to one who enjoys visits to well-kept aviary collections (such as, for example, that at 'Birdland', Bourton-in-the-Water, Gloucestershire) and has himself kept 'escaped' parakeets and the like which have come his way, the average cage-birds show, including the 'National', with its seemingly endless tiers of Budgerigars and Canaries, its curious hybrids (the 'Supreme Champion' this year was a Crossbill $\times$ Canary), and its hummingbirds hovering in minute cages 'decorated' with plastic ferns and carnations, is a place best avoided for his peace of mind. So why go in the first place? Perhaps it is merely morbid curiosity which draws him there. Or the hope that one day he will fathom the 'fancy's' logic which includes Nuthatches with pipits and wagtails in one class; Blackbirds, Song Thrushes and Starlings in another; Mistle Thrushes, Ring Ouzels and Waxwings in a third; and so on. Or perhaps he goes merely to prove to his own satisfaction that in certain years he will find the Crossbill featuring prominently among the 'aviary bred British birds', and in certain others the Waxwing. (This year, inevitably, it was the turn of the Waxwing, and there was also a whole host of northern Redpolls.)

Yet probably the main reason for the bird-watcher's visit will be to see the unfamiliar exotic species which he would otherwise never meet and, more particularly, to become acquainted with those species he might conceivably come across in Britain in the field. Exotic species there certainly were, including tanagers and grackles from Southern America, minivets, white-eyes and a delightful spiderhunter from southern Asia, touracos from Africa, and many others. But, apart from two Olive-backed Thrushes, there were very few cage birds in the show itself to represent those North American or Eurasian species which might be expected to occur rarely in the wild in the British Isles. In at least one sense this was a gratifying discovery. But, in part, the dealers' stands told a different story, for here, among others, were Red-headed Buntings, Scarlet and Summer Tanagers, an Eastern Kingbird and a splendid male Bobolink. These and many other interesting possible 'vagrants' to Britain are frequently advertised in the columns of *Cage Birds* and, knowing something of the variety which is at present imported into the country and which were not exhibited at Olympia, one can only assume that the average aviculturist finds these shows rather depressing too.

Two more observatory reports.—In October (*Brit. Birds*, 58: 448) we included a paragraph on four recent bird observatory reports and, in view of the interest in this item and the widespread popular appeal of the British bird observatories, we are glad

to give details of two other observatories who have lately published separate printed reports for the first time. Since its formation in 1945 a short report on Spurn Bird Observatory has appeared in the annual reports of the Ornithological Section of the Yorkshire Naturalists' Union. Now, in order that the observatory's data may be dealt with more fully, a separate report is to be published annually. The first (for 1964) includes special articles on the autumn passage of terns, skuas and waders, and is obtainable from the warden, B. R. Spence, Spurn Bird Observatory, Kilnsea, via Patrington, Hull, East Yorkshire. Portland Bird Observatory actually produced its first separate report for the year 1963 and both this and the report for 1964 are available from F. R. Clifton, The Old Lower Light, Portland Bill, Dorset. In addition to records from this observatory's recording area at the Bill, the reports cover observations from the rest of the island including Portland Harbour and Ferrybridge. Both the Spurn and Portland reports are priced at 3s. 6d.

Recent reports

By I. J. Ferguson-Lees

(These are largely unchecked reports, not authenticated records)

This summary continues the one published in December (*Brit. Birds*, 58: 527-528) and is confined to the rarities in the last quarter of 1965. The great fall of migrants in early September was inevitably accompanied by a few vagrants. They included a **Great Reed Warbler** *Acrocephalus arundinaceus* at Walberswick (Suffolk); an **Aquatic Warbler** *A. paludicola* at Cley (Norfolk) and two at Fair Isle (Shetland); a **Greenish Warbler** *Phylloscopus trochiloides* at Bamburgh (Northumberland); a party of five **Tawny Pipits** *Anthus campestris* near Minsmere (Suffolk); and a scattering of **Icterine Warblers** *Hippolais icterina* (including ones in Sussex and Co. Cork). September also produced surprising numbers of **Ospreys** *Pandion haliaetus* in the three weeks from the 3rd onwards, about 30 being reported from all parts as far west as the Isle of Man, Lancashire and Cornwall.

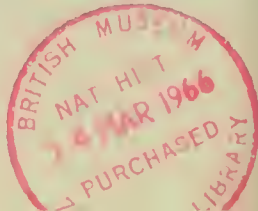
Other Scandinavian and eastern rarities later in the period included **Red-throated Pipits** *Anthus cervinus* on Fair Isle on 13th October and St. Agnes (Isles of Scilly) from the 31st to 4th November; **Richard's Pipits** *A. novaeseelandiae* at Fair Isle, Hauxley (Northumberland), and St. Agnes between 25th September and 26th October; **Tawny Pipits** between Norfolk and Dorset; and, most interesting, what appears to have been an **Indian Tree Pipit** *Anthus hodgsoni* trapped on Fair Isle on 9th September. Buntings included **Rustic Buntings** *Emberiza rustica* on Fair Isle on 4th October and on St. Agnes on 21st and 28th (the last a male); **Little Buntings** *E. pusilla* in Shetland, Essex, Lancashire, Scilly and Co. Kerry between 16th September and 21st October; and **Yellow-breasted Buntings** *E. aureola* on Fair Isle and Skokholm (Pembrokeshire) on 9th and 16th September. The only **Scarlet Grosbeak** *Carpodacus erythrinus* was at Spurn (Yorkshire) on 29th and 30th September; several reports of **Arctic Redpolls** *Carduelis boremanni* on the east coast included one trapped on Fair Isle during 4th-7th November. Warblers were well represented by a total of four **Pallas's Warblers** *Phylloscopus proregulus* at Spurn (two), Portland (Dorset) and St. Agnes between 22nd October and 13th November; a **Dusky Warbler** *P. fuscatus* at Spurn from 26th October to 1st November; a **Greenish Warbler** remained on St. Agnes for some time in early October; and an **Arctic Warbler** *P. borealis* at Hauxley on 16th September; as well as about twenty **Yellow-**

browed Warblers *P. inornatus* on the east coast from Shetland to Norfolk and in Sussex and Scilly between 26th September and 16th October, and a few more **Icterine Warblers**. Two **Thrush Nightingales** *Luscinia luscinia* trapped at Hauxley on 26th and 27th September and 2nd October were the first for the mainland of Britain, all the previous five having been on Fair Isle. A **White's Thrush** *Zootbera dauma* was found on North Ronaldsay (Orkney) on 1st October. At least three **Snowy Owls** *Nyctea scandiaca* stayed in Shetland up to November and one to December (58: 391); one was also seen in Northumberland in November and early December. A **Caspian Tern** *Hydroprogne ischegrava* appeared at South Gare, Tees-mouth (Yorkshire), on 26th September.

By comparison, southern species were few, but notables were a **Black-eared Wheatear** *Oenanthe hispanica* at Blakeney Point (Norfolk) from 31st August to 14th September; and a **Cream-coloured Courser** *Cursorius cursor* at Aberlady Bay (Midlothian) for over a week from 9th October. Warblers included a **Bonelli's Warbler** *Phylloscopus bonelli* on St. Agnes on 4th October, and a wide scattering of about 20 **Melodious Warblers** *Hippolais polyglotta* on the south and west coasts from Kent to Co. Cork and up to Walney Island (Lancashire). There was a **Serin** *Serinus canarius* at Portland on 26th October, a **Lesser Grey Shrike** *Lanius minor* on Whalsay during 17th to 24th October and half a dozen **Woodchat Shrikes** *L. senator* from Kent and Cornwall north to Anglesey, Fife and Shetland. Three **Alpine Swifts** *Apus melba* were seen in Hertfordshire, on Lundy and in Cornwall between 26th and 29th September. **Ferruginous Ducks** *Aythya nyroca* in several counties included three at Abberton Reservoir (Essex) and others west to Devon and Glamorgan and north to Derbyshire. Glamorgan also produced a **Purple Heron** *Ardea purpurea* at Margam on 17th and 18th October. Four **White-winged Black Terns** *Cblidonias leucopterus* were reported in Lincolnshire, Kent (two) and Pembrokeshire between 14th September and 9th October.

It was not an outstanding autumn for American birds, as is illustrated by the fact that **Pectoral Sandpipers** *Calidris melanotos* totalled only ten (early August to 16th October). Co. Kerry produced a male **Green-winged Teal** *Anas crecca carolinensis* on 17th October and a **Long-billed Dowitcher** *Limnodromus scolopaceus* on 26th September. There was a **Semipalmated Sandpiper** *Calidris pusilla* near Lydd (Kent) from 6th to 9th September and a **dowitcher** *Limnodromus* sp. on Whalsay from 20th October to 7th November. Otherwise, the majority of the American birds were in south-west England, including a **White-rumped Sandpiper** *Calidris fuscicollis* on Tresco (Isles of Scilly) from 12th September onwards and another at Marazion Marsh (Cornwall) on 5th November; a **Spotted Sandpiper** *Tringa macularia* on St. Agnes from mid-September to 28th October when there was also a **Yellow-billed Cuckoo** *Coccyzus americanus* there; and two **Buff-breasted Sandpipers** *Tryngites subruficollis* on Lundy on 27th and 28th September. The only American passerine in this period was a **Grey-cheeked Thrush** *Catharus minimus* which was found dying at Lossiemouth (Morayshire) in November.

Finally, there were a number of interesting seabirds during the autumn. Huge concentrations of **Great Shearwaters** *Puffinus gravis* and a good many **Cory's Shearwaters** *Procellaria diomedea* were recorded off the west coast of Ireland and to a lesser extent elsewhere from the Scillies north to Fair Isle and north-east England: at Cape Clear (Co. Cork) these included over 11,000 Great on the 14th and 15th together and more than a thousand Cory's on each of the 14th and 20th. Cape Clear also had at least two **Little Shearwaters** *Puffinus assimilis* on 5th September. At Hauxley, 19th September was a remarkable day because, apart from 21 **Cory's Shearwaters**, it produced a **Frigate-bird** *Fregata* sp. and a **Black-browed Albatross** *Diomedea melanophrys*. Another Black-browed Albatross was seen off Spurn from 4th to 7th November.



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WITHERBY, H. F. (1894): *Forest Birds: Their Haunts and Habits*. London. p. 34.

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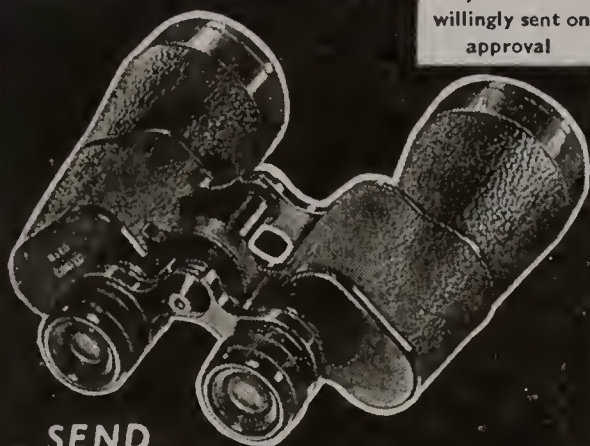
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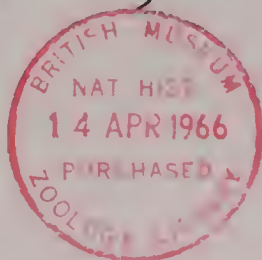
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British Birds

Vol. 59 No. 3

MARCH 1966



Fluctuations in the weights of Bullfinches

By I. Newton

Edward Grey Institute, Oxford

THIS PAPER is based on over 800 weights of Bullfinches *Pyrrhula pyrrhula* from the deciduous woodland of Wytham Estate, near Oxford, from September 1962 to March 1964. The birds were weighed on a spring balance sensitive to 0.1 gram, which was checked about once each month.

ANNUAL CYCLE

The Bullfinch is characteristically a bird of woods and hedgerows; it feeds largely on buds in spring, and for the rest of the year on the seeds of various woodland plants and common 'weeds'. Suitable seeds are abundant and continually replenished from May to September each year; but in winter Bullfinches live mainly on seeds remaining from the previous autumn, and by January food is often short. By March, however, the buds of hawthorn *Crataegus monogyna* and other trees are large enough to provide adequate nourishment and these form the main food through until May.

Pair formation usually occurs from February to April. In most years, the first eggs are laid at the beginning of May and the last about mid-July. After breeding, each adult undergoes a complete moult lasting ten to twelve weeks. At the same time the juveniles also moult, but replace only the body feathers and the coverts of the wings and tail; this takes eight or nine weeks. The start of moult in the population as a whole is usually spread over about five weeks from

Snowy Owl *Nyctia scandiaca*, Scilly Isles, winter
The brown-barred white plumage looks out of place
amongst pine branches (page 108) (photo: John Buxton)

the end of July to the end of August. In certain years, however, some pairs raise a late brood in August or September, and the start of their moult is correspondingly delayed. In winter, Bullfinches are chiefly in small flocks and spend most of the daylight hours feeding.

WING-LENGTH

Wing-length is often regarded as a convenient measure of body-size in birds. Table 1 shows the wing-lengths of first-winter and adult Bullfinches of each sex. All measurements were taken from live individuals just after the moult (i.e. in October and November), by straightening and flattening the primaries against the rule to obtain the maximum possible reading. It can be seen that males had slightly longer wings than females and that, in both sexes, adults had slightly longer wings than birds in their first-winter. However, the differences were extremely small, implying that there is very little between the body sizes of the two sexes and age groups.

Table 1. Wing-lengths of Bullfinches *Pyrrhula pyrrhula* near Oxford

	Males		Females	
	First-winter	Adult	First-winter	Adult
No. measured	156	46	138	44
Mean (mm.)	82.6	83.3	81.7	82.8
Range (mm.)	78-86	79-86	77-85	78-86

SEASONAL VARIATION IN WEIGHT

It was found that the weights of Bullfinches were related primarily to temperature: they were heaviest in winter and lightest in summer. This pattern of weight changes is similar to that of many other species resident in temperate regions (Nice 1937, Baldwin and Kendeigh 1938). For most purposes, the weights have been grouped to obtain monthly averages; and, since weight varies throughout the day, only weighings obtained between 10 a.m. and 12 noon have been used. The monthly averages are shown in tables 2 and 4, together with the mean temperature each month. Trapping was sometimes concentrated in a particular part of a month and, in such cases, temperatures over that period alone have been used.

It can be seen that the average weight of Wytham Bullfinches was highest in January each year and then fell gradually to July, after which it began to rise again. The mean monthly weight of the males varied from 21.9 grams (in July 1963) to 26.5 grams (in January 1963). Thus the highest mean weight recorded for males was 18% higher than

Table 2. Weights of Bullfinches *Pyrrhula pyrrhula* near Oxford, November 1962 to July 1963 and November 1963 to March 1964, excluding juveniles

	Mean temperature (°F) over catching period	Males			Females		
		No. of weighings	Mean weight (grams)	Standard deviation	No. of weighings	Mean weight (grams)	Standard deviation
November 1962	39.1	17	23.8	1.3	8	23.2	2.1
December 1962	34.5	39	24.6	1.4	33	23.9	2.2
January 1963	25.2	26	26.5	1.7	20	26.1	1.7
February 1963	30.8	19	25.6	1.4	14	26.2	1.5
March 1963	43.6	28	24.8	1.3	16	24.5	2.0
May 1963	52.3	37	22.9	1.6	5	26.4	1.0
June 1963	59.9	38	22.4	1.6	10	25.0	1.0
July 1963	60.6	26	21.9	1.2	9	24.3	1.7
November 1963	47.9	12	23.4	1.4	10	23.1	1.7
December 1963	33.6	26	25.6	2.0	27	24.5	1.7
January 1964	34.5	13	25.8	2.0	11	25.1	1.1
February 1964	37.8	18	24.5	1.8	13	25.4	1.1
March 1964	41.2	9	24.0	1.2	8	24.0	0.9

the lowest mean, and changes of up to 27% were recorded for individuals. The weight changes of the females were less pronounced since they were usually heavier than the males in the summer.

Seasonal weight changes are discussed in detail below, where the year has been divided into the breeding season (May to July), the moult season (August to October) and the winter period (November to March). No Bullfinches were caught in April of either year.

WEIGHT DURING BREEDING SEASON (MAY TO JULY)

Adults

From May to July 1963, 101 weighings of male Bullfinches were obtained and 24 of females. Over this whole period, the males averaged 22.7 grams and the females 24.7 grams, a difference which is statistically significant ($p < 0.002$). The mean weight of the males was lower in the breeding season than at any other time, and lowest of all in the latter half of July. The mean weight of the females, on the other hand, was almost as high in summer as during a cold spell in winter; but it also fell from May to July. It has been shown that the females of many other bird species are disproportionately heavier than the males during the breeding season (Nice 1938, Baldwin and Ken-deigh 1938).

The increase in weight of female Bullfinches in summer was not caused solely by the advent of eggs, because several females were caught at nests after the eggs had been laid and were still markedly heavier than the males (see table 3). Furthermore, the disparity between the sexes persisted into August 1963, beyond the end of the

Table 3. Weight changes in four Bullfinches *Pyrrhula pyrrhula* near Oxford during the nesting cycle

All these weights were obtained between 10 a.m. and 10.30 a.m.

	Date	Mean temperature (° F)	Stage of nesting cycle	Weight (grams)	
				Male	Female
PAIR 1	23 June	56.9	Incubation (6 days)	22.8	25.6
	24 June	56.8	Incubation (7 days)	22.5	25.2
	12 July	59.9	Nestling (11 days)	21.5	23.7
	20 July	66.3	Nestling (19 days)	21.2	22.3
PAIR 2	17 May	56.3	Laying	22.4	26.3
	23 May	49.8	Incubation (5 days)	22.6	25.6
	2 June	59.3	Nestling (1 day)	22.5	25.2
	9 June	65.4	Nestling (7 days)	21.0	23.8
	16 June	60.3	Nestling (14 days)	20.9	22.5

laying season in that year. Presumably, therefore, the females were not only heavier on average because some of them may have contained a well-developed egg (about 2 grams), but also because active ovaries are heavier than the active testes of males. It is also possible that females are fatter than males in the breeding season; they are certainly less active for much of this time. Nevertheless, the greatest disparity between the weights of the two members of a pair always occurred just before laying.

Two pairs of Bullfinches were caught at the nest several times during the nesting cycle, and table 3 shows their weight changes. It may be seen that throughout the cycle the females from these nests were markedly heavier than the males. But the weights of all these four individuals declined while they were feeding young; and this occurred irrespective of changes in temperature. During the nestling period, the two females lost 13% and 14% of their initial weight and the two males (which were lighter than the females at the start) lost 6% and 7% respectively. While they were feeding young, the weights of all four were below the means for the population as a whole. This was presumably because, with many nests taken by predators (Newton 1964), only a small proportion of Bullfinches are feeding young at any one time. Such a pronounced fall in weight during the nestling period suggests that the act of feeding dependent young might place a considerable strain on parent Bullfinches.

In a study of the American Song Sparrow *Melospiza melodia*, the weight of the females increased markedly just before laying and fell again after the eggs had been laid; it increased slightly during incubation, but decreased again—sometimes by as much as 9%—while the young were being fed (Nice 1938). The weights of certain pigeons and doves have also been found to rise by up to 8% during incubation (Riddle and Braucher, in Nice 1938). Nice suggested that, in some species, the incubation period may represent a recuperative spell after the strain of egg-laying, though weight-loss occurs again when the young are being fed.

Juveniles

In the summer of 1963 no young were caught until mid-July, although those from the first nests fledged in early June. The mean weight of twelve juveniles caught in the latter half of July was 20.8 grams (s.d. ± 0.86), while that of 26 adult males caught in the same month was 21.9 grams (s.d. ± 1.2). The juveniles were therefore on average 5% lighter than the males, a difference which is statistically significant ($P < 0.001$). The weights of juveniles caught later in the summer (during the main moult period) are given in the next section.

Excluded from the above totals are the weights of two juveniles

caught soon after fledging and while they were still dependent on their parents for food. These birds (from different broods) weighed 17.5 grams and 17.2 grams. This is about a gram less than the mean weight at fledging, which suggests that there is some temporary loss of weight soon after leaving the nest.

WEIGHT DURING MOULT PERIOD (AUGUST TO OCTOBER)

During the main moult period, the population may include adults and juveniles (a) that have not started to moult, (b) that are in moult and (c) that have completed the moult. The mean weights of males and females in each of these classes is given for the moult period each year in table 4.

Adults

In August 1963, female Bullfinches that had not begun to moult were still significantly heavier than males ($p < 0.01$), even though the laying season had ended in the previous month. However, the males gained weight at the onset of moult and the discrepancy between the sexes was then evened out. Thereafter, there was no significant difference between the weights of moulting adult males and females, and the weights of both increased as the moult progressed.

Juveniles

Throughout the moult period, juvenile Bullfinches that had not started to moult were lighter than those that had. But only in August 1963, when large samples were caught, was the difference significant ($p < 0.001$). This suggests that juveniles generally reach a certain minimum weight in late summer before beginning to moult. Among moulting juveniles there was no significant difference between the weights of males and females.

In addition to the above conclusions, there were further trends which were not significant in any one month, but which were fairly consistent throughout the moult period. Thus moulting juveniles were usually lighter than moulting adults; but juveniles that had completed the moult (first-winter birds) were about the same weight as adults. This suggests that juvenile Bullfinches continue to gain weight at least until the end of the post-juvenile moult. After this, there was no significant difference between their weights and those of adults on the samples I had.

Bullfinches of all classes gained weight during the moult period, presumably partly in response to lowered temperatures. The immediate increase in the weights of adult males starting to moult may in part reflect a recovery from the strain of breeding. It is also possible that extra fat is accumulated with the onset of moult and this might

Table 4. The weights of Bullfinches *Pyrrhula pyrrhula* near Oxford during the moult period

The figures in brackets show the numbers weighed. Standard deviations are given only when more than ten in any class were weighed

	Mean temperature (° F)	Moult not started		Moult in progress		Moult completed	
		Males	Females	Males	Females	Males	Females
ADULTS							
September 1962	55.9			25.3 (4)	23.2 (4)		
October 1962	51.5			22.8 (7)	23.7 (5)		
August 1963	58.9	21.9 ± 1.5 (17)	23.2 ± 1.3 (19)	22.7 ± 1 (26)	23 ± 1.5 (18)		
September 1963	56.4			23.5 ± 1 (13)	23.4 (5)		
October 1963	48.1			23.9 (3)	23.4 (1)		23.6 (1)
JUVENILES							
September 1962	55.9	21.5 (4)		23.1 ± 1.3 (13)	23.4 (8)	25.3 (2)	24.1 (6)
October 1962	51.5	22.2 (3)		23.9 ± 2 (23)	23 ± 1.2 (16)	24.2 ± 1.4 (13)	23.6 ± 1.5 (12)
August 1963	58.9	21.5 ± 1 (26)		22.6 ± 1.8 (31)	23 ± 1.5 (27)		
September 1963	56.4	21.9 (3)		22.7 ± 1.9 (23)	22.7 ± 1.8 (23)		
October 1963	48.1			23.7 (6)	21.7 (4)	23.9 (8)	22.5 (8)

provide additional insulation in compensation for lost feathers.

Moult is often regarded as a time of physiological stress (Pitelka 1958) and there is much information on weight changes during moult in some other species. Like the Bullfinch, many show an increase in weight while moulting (examples in Baldwin and Kendeigh 1938), and at least one species, the American Mockingbird *Mimus polyglottos*, even reaches its peak weight during this inactive period (Laskey, in Nice 1938). On the other hand, Beck (in Nice 1938) reported heavy weight loss during moult in domestic fowls, Rowan (1963) a loss of 17% in the African Yellowbill Duck *Anas undulata*, and Marples (1942) a minor reduction in the Little Owl *Athene noctua*. Nice (1938) found that Song Sparrows were 'undoubtedly' at their lowest weight in August and September, when the moult occurs. Various penguins, which fast throughout the moult, accumulate fat prior to its onset, and often lose 40% to 50% of their initial weight by the time the plumage is replaced (Richdale 1957). In the petrel *Pachyptila vittata*, however, Richdale (1947) found that there was no change in weight during moult. Thus, while some species (such as the Bullfinch) gain weight during the moult, others lose it and others still show no significant change. I have recently discussed the weight changes of Bullfinches during moult in greater detail elsewhere (Newton 1966).

WEIGHT IN WINTER (NOVEMBER TO MARCH)

In both winters Bullfinches were heaviest in January, which was the coldest month in each case (table 2). At the start of the cold spell in January 1963, mean weight increased by 2 grams (11%) from the December level; and individuals gained from 1% to 15% of their December weights. Furthermore, Bullfinches were heavier in January 1963, when there was a mean temperature of 25.2° F, than in January 1964, when the mean was 34.5° F. Two individuals were caught on the coldest day of the winter in both years: they weighed 26.7 grams and 25.5 grams respectively on 23rd January 1963 (mean 13.2° F), and 24.4 grams and 23.6 grams respectively on 17th January 1964 (mean 28.1° F).

In most winter months, the males averaged slightly heavier than the females, but only in January 1964 was the difference significant ($p < 0.05$). In this month, when the difference between the sexes was greatest, there was an acute food shortage (Newton 1964), so perhaps females are inferior to males in competition for food.

SIGNIFICANCE OF WEIGHT INCREASE IN COLD WEATHER

Increased weight in winter has been recorded in many bird species (Nice 1938) and is apparently adaptive. Thus Kendeigh (1934) has shown that heavy birds have a greater resistance to cold than do

lighter ones of the same species, especially if food is scarce. At high temperatures, the reverse is true: lighter birds have a greater resistance to heat. Weight increase in cold weather has been attributed to a deposition of fat and carbohydrate; the fat is stored mainly beneath the skin and among the viscera, and the carbohydrate (mainly in the form of glycogen) in the liver and the muscles (King and Farner 1961).

Dr. P. R. Evans and I have recently analysed some carcasses of Bullfinches killed at various times of year to determine the proportions of fat, water and non-fat dry material in each individual. It was found that the increase in weight in winter was due to an increase in all three components, but that, while the water and non-fat dry material increased in proportion to one another, the fat-content often increased much more. Thus, an increase in fat-content accounts for a varying (but usually greater) part of the weight increase in winter, and most of it is deposited among the viscera, in the furculum and below the skin, especially that beneath the feather tracts. It has been suggested (Mackay 1965) that exceptionally heavy weights of birds might result from the retention, during starvation, of an unusual amount of water— a state known as nutritional oedema. Of the birds we analysed, some were exceptionally heavy, but none had an abnormally high water content. These data have been discussed in detail elsewhere (Newton and Evans in press).

Baldwin and Kendeigh (1938) detected a very close correlation between the daily weights of some Chipping Sparrows *Melospiza passerina* and the air temperature the same day, indicating that the physiological response to temperature must be very rapid in this American species. They suggested that the stored fat might act both as an insulator and as a food reserve through long cold winter nights. According to these authors, daily fluctuations in the body weights of small birds result not merely from the emptying and filling of the digestive tract, but from an extensive utilisation of the stored fats and carbohydrates during the night and their replacement during the day. The drop in weight overnight is probably greatest at low temperatures, as a result of an increase in the rate at which the stored foods are utilised. At the start of a cold spell the loss is usually more than compensated by increased feeding the following day and the bird gains weight. It seems likely that reduced temperature *per se*, and not only increased weight loss at night, stimulates intense feeding, because response to temperature often occurs in the daytime when there is no loss in weight.

It is well known that birds need to eat more food during cold weather to maintain their body temperature (Stevenson 1933, Kleibes and Dougherty 1934). Thus Kendeigh (1934) found that the daily food intake of captive House Sparrows *Passer domesticus* rose by 12%

when the temperature was lowered from 10°C to -14°C . In addition, Gibb (1954) noticed that the feeding behaviour in tits *Parus spp.* was more intense during very cold weather, and precautions against predators were relaxed then in the urgent need to find enough food.

In winter, Bullfinches feed largely on the seeds of ash *Fraxinus excelsior* and birch *Betula alba* in years in which they are available (as in 1962/63); and, since these seeds remain on the trees throughout the winter, this food supply is not affected by snow. But in years when the crops of these tree-seeds fail (as in 1963/64), the seeds of low-growing herbs and brambles *Rubus fruticosus* form the main food and, as they are easily covered by snow, the amount of food available then is greatly reduced. It is possible that the extra accumulation of food-reserves at the onset of cold weather may help to carry a bird through to the end of a snow period when food again becomes more plentiful. But during the study period, there was no evidence of any loss in weight during a snow period. If fat acts as an insulating layer in the Bullfinch, as has been suggested for many species (see Baldwin and Ken-deigh 1938), the loss of part of this fat would cause an increase in the rate of heat loss from the body and probably result in rapid death. Mere temporary food-shortage could thus be critical during very cold weather. It seems most likely, therefore, that the accumulation of fat in the Bullfinch serves as a short-term protection through long cold winter nights and perhaps also as an insulation against excessive heat-loss, not as a long-term reserve for prolonged cold weather. If the latter were true, the weight increase should occur before the cold weather begins, and not in response to it. Throughout the study period, even at times of heavy mortality, Bullfinches were never caught in poor condition and markedly below average weight. This suggests that death from starvation and heat-loss is very rapid.

In addition to the increased food-reserve carried by a bird in winter, the plumage is also heavier (Nice 1937); and Wetmore (1934) established by actual counts that the feathers are more numerous than in summer. Also, at extremely low temperatures, many species of birds can increase the rate of metabolism and heat production in the body through endocrine (thyroid) control (King and Farner 1961). In such species, acclimatisation to cold weather is in part insulative and in part metabolic.

Finally, it is worth stressing that the seasonal weight variations of Bullfinches were not correlated with the amount of food available, as various authors have suggested for other species; Bullfinches were heaviest in snow periods when food was least readily accessible. This held both in the severe winter of 1962/63, when ash and birch seeds were plentiful, and in the comparatively mild winter of 1963/64, when these seeds were scarce.

WEIGHTS OF BULLFINCHES

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SUMMARY

The weights of Bullfinches *Pyrrhula pyrrhula* near Oxford from September 1962 to March 1964 were inversely correlated with temperature; they were heaviest in winter, especially during cold spells, and the increase was caused partly by a heavy deposition of fat.

For most of the year, there were no significant differences between the weights of males and females. During the breeding season, however, females were heavier than males; and during a period of acute food-shortage in winter males were slightly heavier than females. It is possible that the act of feeding dependent young places a considerable strain on parent Bullfinches, since both sexes lose weight during the nestling period.

Juvenile Bullfinches generally reached a certain minimum weight in late summer before beginning to moult. They remained lighter than adults until the end of the post-juvenile moult, after which there was no significant difference between the weights of the two age groups. All Bullfinches gained weight during the moult, presumably partly in response to lowered temperatures.

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Pied Wagtails roosting inside greenhouses

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INTRODUCTION

THE PURPOSE of this paper is to bring together data on the communal roosting of Pied Wagtails *Motacilla alba yarrellii* inside commercial glasshouses. These data are from three sources: references in the British literature (three), personal observations at a Somerset site, and the results of enquiry letters published in two horticultural trade papers. Observations on Pied Wagtails nesting inside glasshouses are also included.

EARLIER OBSERVATIONS

Bunyard (1936) was apparently the first to record a roost of Pied Wagtails in greenhouses. For about ten years up to and including the 1935/36 winter as many as 500 occupied the greenhouses of George Mount and Sons of Canterbury, Kent, arriving in the early autumn and disappearing altogether in the spring. The wagtails '... take up their positions on the steel struts and hot water pipes. On the latter they sit in rows almost touching one another. ...' Recent enquiries have failed to reveal whether this roost continued after the 1935/36 winter; certainly it was not occupied in February 1966 (Rodney Smith *in litt.*).

Minton (1960) reported a roost from Milton, near Cambridge, which in 1959 had been occupied for about five years, the Pied Wagtails usually being 'present in large numbers from July until early November, and again in smaller numbers in the spring'. Exceptionally, the greenhouse concerned was also occupied during the severe weather of February 1958. Between 600 and 800 wagtails were estimated in September 1959, the number declining to 50 at the end of October when the remainder finally dispersed (to several reed-bed sites) because of the removal of the tomato plants and the closing of the windows. Much damage was caused by their fouling the plants, particularly in the spring.

Since the publication of Minton's note, observations and ringing work have continued at Milton and Dr. Minton and S. Fenn have kindly given me further details. The main conclusion is 'that the majority of the birds are local but that some passage migrants, feeding probably at the local sewage farm, are drawn into the roost in the autumn months' (C. D. T. Minton *in litt.*). The roost is occupied by good numbers only from July to mid-October, a period which corresponds with the presence of well-grown tomato plants, but a very few use it *all* the year round. During 1961 it was estimated that 800-1,000 individuals were using the roost, but there was a maximum of 400 on any particular night. In that year 335 were ringed, but in 1962 only 221, reflecting the fact that not so many were using the roost. The severe weather of early 1963 reduced the ringing totals for that year and 1964 to 20 and two respectively. The population seemed to have recovered slightly in 1965, but no regular observations at the site were possible (S. Fenn *in litt.*).

Cohen (1960) described a greenhouse site near Sway, Hampshire, which was used for about ten years by nesting and roosting Pied Wagtails in increasing numbers. The birds caused such financial loss by damaging carnation blooms that the owner killed about 600 of them in early February 1958. The site was not occupied in 1959 and, although numbers started to build up in March-April 1960, there have been none since 1960 (Edwin Cohen *in litt.*).

A SOMERSET ROOST

Early in 1965 T. B. Silcocks and Colin Selway drew my attention to a glasshouse site at the Cheddar Valley Nurseries just west of Axbridge, Somerset, and directly opposite the Cheddar Reservoir. On 9th August 1963 Mr. Silcocks had found 20 Pied Wagtails roosting in one of the glasshouses there.

I first visited the nursery in June 1965, and John Padden, the manager, told me that to the best of his recollection the wagtails had been coming certainly for twelve and probably for twenty years. His impression was that they usually came about July and deserted the greenhouses about September. Anything up to 100+ were involved. On one occasion a cat killed 50 or 60. He had also known pairs to nest inside.

A weekly watch by Miss Sarah Padden, assisted by Michael Kendall and myself, to determine the seasonal occupation in 1965 and the approximate numbers involved was started in June 1965, before the birds began to roost there, and continued until they deserted the dormitory. The absence of a vantage point from which to spot arrivals, the large size of the greenhouse involved and the denseness of the tomato growth inside combined to make accurate estimation of

numbers impossible. There were none on 26th June, three on 3rd July, and about 20 on 10th July. By 14th August the number had risen to 200+ and remained at roughly this level until 9th September when for horticultural reasons the wagtails had to be locked out for one night. On 11th September about 50 assembled, but are believed not to have entered the greenhouse. A week later about 65 appeared, of which about 30 went into the greenhouse. On 26th September about 80 entered, and 46 were trapped and ringed by R. F. Thearle. A week later 25 gathered but moved on and this was the last time any were seen.

Sample age ratios were as follows: 25th July, 19 adults and 49 juveniles; 14th August, 22 and 157; 21st August, 32 and 91; 25th September, 19 and 23. A juvenile ringed on 3rd July at Chew Valley Lake ($8\frac{1}{4}$ miles north-east) was caught in the glasshouse on 26th September.

On 14th August an immature Grey Wagtail *Motacilla cinerea* was seen to enter the greenhouse along with the Pies, and on 21st August two Yellow Wagtails *Motacilla flava* assembled with the Pies and probably roosted with them, but were not actually seen to go into the greenhouse.

So far as could be observed, the majority of the wagtails appeared usually to come from the south, i.e. from the direction of the Cheddar Reservoir, the nearest edge of which is less than half-a-mile away. Before actually entering the greenhouse they would perch outside for some time. On 21st August, a clear and sunny evening, K. E. L. Simmons noted that they rested, preened and head-scratched, appeared to feed by pecking at the woodwork and glass and, as it became darker, hawked for flying crepuscular insects after the manner of a flycatcher. As they arrived, and if disturbed after arrival, the familiar *tschiz-zik* call would be given; but there was no assembly chorus as has been recorded at other kinds of roosts, e.g. Dublin (Moffatt 1931), Belfast (personal observation), Esher Common, Surrey (Keywood 1937), and Richmond Park, Surrey (Colyer 1938).

OTHER GREENHOUSE ROOSTS

Two horticultural trade journals—*The Grower and Prepacker* and *The Commercial Grower*—carried a letter from me in September 1965, inviting readers to report further instances of glasshouse roosting by Pied Wagtails. Twenty communications were received, 17 of which referred to communal roosting inside greenhouses (at a total of 18 sites). Of these 17 letters, seven also mentioned nesting by Pied Wagtails inside greenhouses, as did the remaining three letters. The salient points from each letter and from subsequent telephone conversations with most of the correspondents are given below, by

counties in alphabetical order. The nesting data are included since there may be some relation between the roosting and nesting behaviour, and because in any case *The Handbook* makes no mention of nesting inside glasshouses.

Co. Dublin. 'Wagtails, in large numbers, very troublesome in glasshouses under my management in years around 1960 in Co. Dublin' (W. Rankin).

Dorset. For two seasons in the late 1950's, from about September into December, 500-1,000 Pied Wagtails slept in a half-acre greenhouse near Wimborne, belonging to Moore and Son Ltd. Many perched on the tallest chrysanthemums and such was the damage their droppings caused that the foreman of the nursery had to close the ventilators each day before the birds assembled. Later, Blackbirds *Turdus merula* started entering the greenhouse by day to raid the early tomato crop and all vents had to be wire-netted. However, 'tens' of Pied Wagtails still roosted under an open glass structure (Raymond Moore).

For a number of years Pied Wagtails appeared at Langham, also near Wimborne, but when in 1963 there were more than 30, the greenhouses were shut early to prevent the birds fouling the flowers. Since then pairs have nested among pots on the staging in more than one greenhouse (D. C. Trehane).

Essex. In past years about 40 Pied Wagtails occupied greenhouses at St. Chad's Nurseries, Little Clacton, Clacton-on-Sea; apparently 'the birds moved into the glasshouses in spells of cold or adverse weather and remained in them all day and night'. Although a nest in 1964 was only two feet from a fairly frequently used inside path, the pair concerned successfully raised several young (C. E. Kennett).

At Sewardstone, Chingford, approximately 300 roosted on tomato plants from early September 1964 until the plants were removed during October. The birds returned in early September 1965, the maximum being about 60, and were still present at the time of writing on 26th September (P. F. C. Rumsey).

Gloucestershire. For probably ten years, up to fifty Pied Wagtails have at least attempted to occupy greenhouses at Cheltenham from July until December (the houses being kept closed from January to March). They had to be kept out each July and August because of fouling tomatoes, and each November and December because many then perched on chrysanthemums (H. J. Williams).

Hampshire. A score or more roosted annually for several years up to the severe weather of early 1963 at a nursery near Fareham, perching on guiding wires and actuating rods high in a greenhouse. Nesting was also observed (F. C. B. Hammond).

For about ten years about 200 wagtails used 'Dutch light greenhouses' at Sarisbury, near Southampton. 'For the first years the birds first appeared late August or early September, but lately it is July when we first see them. The birds leave at the time of clearing out the greenhouses . . . during the first two weeks of October'. The wagtails have recently had to be wired out (D. S. Phelps).

Hertfordshire. Up to about ten roosted at Verulam Nursery, Bedmond, near Hemel Hempstead, up to 1962. In 1962 a pair nested 'in the tomato plants', but deserted four eggs because of workers attending plants (L. H. Hodgins).

Upwards of 100 roosted at Turnford, near Broxbourne, in the winter of 1956, but not before or since. In preceding years pairs bred successfully (J. Browning).

About 1943-45 a pair reared young in two successive years from nests in a cucumber house at Harpenden (H. G. Read).

Up to 40 roosted on occasion at Little Hallingbury, Bishop's Stortford. One pair nested each year for four years up to 1965 (B. C. Yorke).

'Roosts of Pied Wagtails have from time to time developed in glasshouses in the

Lea Valley, at Hoddesdon and Cheshunt. In general they have been of brief existence due to various discouraging activities by the owners' (T. W. Gladwin).

Kent. About twenty years ago hundreds entered a greenhouse at North End, Erith (W. G. Fuinn).

Lancashire. Breeding was noted over several years in glasshouses at Wrea Green, near Preston, the nests being on the ground near the bases of the tomato plants, the young always successfully finding their way out (F. E. Passingham).

Middlesex. Every year for about thirty years Pied Wagtails in varying numbers up to hundreds have used a pair of greenhouses (each being 230 feet by 30 feet) in the centre of three acres of glass at Highfield Road, Sunbury-on-Thames. On 14th September 1965, 400-500 were estimated to be present. They perch on struts, wires and hotwater pipes. So far as can be recalled, they first appear in September each year, but do not continue through the winter (W. Homewood).

Somerset. During most of the years from 1934 to 1953 about fifty patronised one particular glasshouse among a number at the Fruit and Flower Farm, Nailsbourne, near Taunton. They arrived by November and some continued right through the winter and spring into June. They perched high on the wires used to support the plants. On one occasion, in about 1951, a Little Owl *Athene noctua* got into the house and killed most of the ones present (Mrs. Pauline M. Whittuck). In recent years, there has been no communal roosting at Nailsbourne, but two or three pairs have annually succeeded in rearing two broods of young, the nests being built in strawberry pots (Hugh O'Connell).

For about twenty years anything from 50 to 300 have roosted in a nursery at South Petherton, near Crewkerne, where some damage was done to tomato plants. Seasonal occupancy is not precisely known, but includes July, August and September. In about late July 1965 'there were many dead wagtails and one live owl . . . and it was some weeks before the wagtails returned' (A. D. Goddard).

Surrey. During the period from October to December 1964, fifty to a hundred tried to roost inside the 'temperate house' at the Royal Horticultural Society's Garden at Wisley. An attempt was made each evening to keep them out by shutting the vents early, but a few always managed to get in, and the remainder were not discouraged from returning each evening (David Knight).

Yorkshire. One pair fledged five young from a nest on a soil block machine near Thirsk (D. L. Moxon).

DISCUSSION

Communal roosting by Pied Wagtails inside greenhouses is thus now known from 22 sites. There can be little doubt that more exhaustive enquiries would reveal many other instances and it seems likely, therefore, that this use of glasshouses by Pied Wagtails occurs on a much wider scale than was previously suspected.

Data on the seasonal occupancy of these roosts is very scanty because the large majority of the observers have been nurserymen who do not pretend to be ornithologists and who had no reason to suppose that the presence of the birds was noteworthy. An analysis of sites occupied in specific months produces the following frequency table:

J	F	M	A	M	J	J	A	S	O	N	D
1	2	2	2	1	1	5	5	7	5	4	3

It must be most carefully borne in mind, however, that the availability of the greenhouses for roosting purposes varies seasonally since the ventilators through which they enter may be open or closed for a variety of reasons, or for no reason.

Dr. C. D. T. Minton (*in litt.*) believes that the presence or absence of good-sized vegetation inside the house may also influence seasonal occupancy. He writes: 'I think the prime limitation on the periods of roosting is determined by when the windows are left open at dawn/dusk and (to a lesser extent) when the vegetation in the greenhouse is sufficient for roosting in or on. Thus spring roosting is not common—windows mostly closed and vegetation low. Autumn roosting is most common—windows open and tomatoes, chrysanthemums, etc., well grown. Winter roosting is low—windows closed and no vegetation.' His observations at the Milton roost were consistent with this explanation.

Why should Pied Wagtails roost in glasshouses? It might be thought that they do so because no site of the type which they more usually select is available. This, however, is rather improbable since *The Handbook* (1: 226) says, 'roosts . . . in widely varied situations, of which reed-beds and tangled aquatic vegetation are the commonest . . .' It appears likely, therefore, that they prefer glasshouses, rather than that they are forced to resort to them; indeed, it seems reasonable to conclude from the widespread distribution of the behaviour, the period of time over which it has been observed (about forty years) and the tenacity with which some sites have been occupied (up to about thirty years) that some selective advantage accrues to greenhouse roosters—or at least that they suffer no selective disadvantage.

What could be the possible advantage, or advantages, over more natural sites? On balance, Pied Wagtails inside a greenhouse may be less accessible to predators, although when an enemy can and does get in, the house can act as a death trap, as several of the observations above—involving two owls, a cat and, on at least one occasion, man—show.

Conservation of energy is a more obvious argument. Under glass Pied Wagtails will be (a) sheltered from rain and (b) sheltered from wind, and (c), whether the greenhouses at the time are artificially heated or not, they are likely to be in warmer air than in most natural sites. These three factors would all tend to reduce heat-loss, and the last—in a *heated* greenhouse—could be very significant. But the idea that the need to keep warm influences roosting behaviour is easier said than proved. Minton's instance of the return to a greenhouse in severe February weather and the similar observation from Essex support this explanation very strongly; and Bunyard's description of close rows of wagtails perching on the actual hot water pipes is suggestive; but this is the most direct evidence that there is.

In the cases of at least nine of the 22 sites the wagtails are known to have been unwelcome to the nurseryman. The reaction of female workers at nurseries has varied, however: at Sway they threatened to stop work because of the mess they got into; at another establishment a stoppage was proposed on the grounds that the shutting out of the birds by the management constituted cruelty to dumb animals.

That nesting by Pied Wagtails inside these houses should be reported from twelve different locations is noteworthy, partly because *The Handbook* makes no mention of such sites and partly because it could be related historically as a cause or effect of the roosting behaviour. Nesting in greenhouses is doubtless much commoner than these dozen records suggest.

ACKNOWLEDGEMENTS

I am grateful to John Padden for allowing access to greenhouses in his charge; to Sarah Padden, Michael Kendall, K. E. L. Simmons and Peter Morrison for making observations; to the editors of *The Grower and Prepacker* and *The Commercial Grower* for publishing my request letter and to all those who replied; and to Stanley Cramp and K. E. L. Simmons for helpful comments on an earlier draft of the paper.

SUMMARY

Communal roosting by Pied Wagtails *Motacilla alba yarrellii* inside commercial greenhouses has now been recorded from a total of 22 sites in Britain and Ireland; further investigation would doubtless reveal many more cases. Most roosts have been tenanted for several seasons, the maximum known period being about 30 years. Numbers of birds on any one night have varied from 'tens' up to 500 or perhaps 1,000.

Data on seasonal occupation is scanty, but at least one roost has been recorded in every month of the year, with a large peak in September and a small one from February to April. Possible advantages of greenhouse roosting are shelter from the elements and added protection from predators.

Incidental records of nesting by Pied Wagtails inside greenhouses are included here from twelve sites, but there are other known instances of this.

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Photographs of Ring Ouzel nests in Derbyshire

By H. A. Hems

(Plates 19-20)

PLATES 19 AND 20 show a variety of nests of Ring Ouzels *Turdus torquatus* in Derbyshire. These range from what is by far the most common site, on an overgrown bank, to a very unusual nest five feet up in a tree. Nests of the first type (plate 19a) are sometimes trodden on by passing sheep and I have also known these animals push the eggs out with their noses. When a nest is on a bank with a steep slope of, say, 45° or more, its rim is often markedly higher on the outer edge. Stream-side sites such as that in plate 19b are fairly common and can be in very damp places; in 1962 I saw a nest containing five eggs under a small waterfall in a position more generally associated with Dippers *Cinclus cinclus* than Ring Ouzels.

In good years Ring Ouzels are well distributed in suitable habitats in Derbyshire, especially from 700 feet to 1,000 feet above sea-level, but also in small numbers up the valley sides to almost 2,000 feet. The lower levels, where the birds are most common, seem to be much lower than those in the Yorkshire Pennines: for instance, in 1948 I was told at Malham Tarn, Yorkshire, that Ring Ouzels are seldom seen there below 1,300 feet. The feeding habits in these two counties are also apparently very different. Harold A. Lowes has found that in Yorkshire the young are fed mainly on caterpillars, moths and other insects, whereas in Derbyshire their diet consists almost exclusively of worms.

In the area where they are densest, the Derbyshire Ring Ouzels seek their food in the poor pastures which flank the busy Snake Road linking Sheffield and Manchester. These pastures are maintained by local farmers for cows and sheep and, if the number of worms in the mole-hills which at times almost obliterate the grass is a true indication, the total worm population must be enormous. Even the Ring Ouzels which nest at considerable distances from these pastures seem to prefer to make the journey to and fro in search of food, and the breeding population is very dense in the immediate area. As an example of this density, there were three other nests at distances of 100 yards to 300 yards from the tree nest shown in plate 20b (two of them conventional bank nests and the third a stream-side nest similar to that in plate 19b). In fact, the nests in plates 19 and 20 were all within 400 yards of the Snake Road (at heights ranging from 750 feet to 900 feet above sea

level). I have seen one nest only ten yards from this road and another in the wall of a gamekeeper's garden.

In this part of Derbyshire the Ring Ouzel and the Blackbird *T. merula* both feed and nest in close proximity, and the woodland Tawny Owl *Strix aluco* is the seemingly unlikely predator which takes a proportion of the newly fledged young of this moorland species.

Notes

Feeding and resting behaviour of a Snowy Owl in Scilly.—During the five months from mid-October 1964 to mid-March 1965 a female Snowy Owl *Nyctea scandiaca* visited Tresco, Isles of Scilly, for long periods at a time. She was also seen on various other islands from 10th October 1964 onwards (*Brit. Birds*, 58: 363).

The bulk of this Snowy Owl's prey consisted of Rabbits *Oryctolagus cuniculus* obtained close to Tresco Abbey and the Great Pool. She caught some of these herself out in the open, but also took others from snares as well as dead ones which were regularly deposited near her known roosting place. She usually found these carcasses quickly, sometimes within minutes, and, pulling them to pieces, swallowed large pieces of meat and fur. She was also seen to snatch a Coot *Fulica atra* from the surface of the Great Pool and to pounce on and kill a cock Pheasant *Phasianus colchicus*. At dusk on 27th January 1965 R. M. Curber, K. Fox, R. J. Prytherch, N. R. Webb and others watched her quartering the water meadow by the west side of the Great Pool with a waddling and ponderous gait and intermittently jumping into the reeds near-by; Moorhens *Gallinula chloropus* were particularly numerous just there and she may have been trying to catch one.

The Snowy Owl spent much time perched in the tall Monterey pines *Pinus radiata* in the Abbey garden from which she had a good view of the open country and water near-by; plate 17 shows two photographs taken there by John Buxton. Once she alighted on the topmost flimsy branches of one of the pines and spread herself in a squatting attitude. On another occasion, during heavy rain, she was observed on a seaweed-covered rock a few inches above the sand and a few yards from the receding tide. She also perched on rocky promontories and was occasionally seen partly concealed in bracken-covered ground. BERNARD KING, FRANK NAYLER and F. WARDLE

Aggressive Tawny Owls.—I was interested in the recent note by Jeffery Boswall on a Tawny Owl *Strix aluco* which attacked a man



PLATE 18. Above, Needle-tailed Swift *Hirundapus caudacutus*, Australia, November 1958, showing the white face and U-shaped patch under the square-ended tail (pages 109-111) (photo: John Warham). Below, nest and egg of Blackbird *Turdus merula* under the offside wing of a car in regular use (page 112) (photo: Charrett & Clarke)





PLATES 19 and 20. Ring Ouzels *Turdus torquatus* at a variety of Derbyshire nest-sites. Above, a second brood in a typical site under overhanging dead bracken on a steep bank, Ashop Valley, July 1950. Below, a common site under an overhang of rock about five feet above a stream in a narrow valley, Blackden Brook, June 1956





Above, an exposed site on an almost vertical bank of crumbly laminated shale and clay and roughly twelve feet above the floor of a wide gully, Oyster Clough, May 1959. Below, an exceptional site in forked branches some five feet up in a stunted alder overhanging Blackden Brook, May 1964 (pages 107-108) (*photos: H. A. Hems*)





PLATE 21. Immature Osprey *Pandion haliaetus* after coming on board a trawler off Scotland, August 1963, and being taken to Hull (Y.N.U. Orn. Rep. 1963: 128); note the underwing pattern (photo: *Yorkshire Post*). Below, exposed nest of House Sparrow *Passer domesticus*, Gloucestershire, 23rd May 1964 (page 114) (photo: J. G. Restall)



whenever he walked near its nest after dark over a period of three weeks in April and May 1964 (*Brit. Birds*, 58: 343-344). For a similar period in late June and July 1965, a Tawny Owl regularly attacked the night staff of one of the hospitals in Nottingham and on one occasion severely lacerated the face of a male nurse. This was reported to me by the hospital engineer who said that the attacks occurred whenever anybody passed through a gate on the way between the nurses' quarters and the wards during the hours of darkness. The nest, which contained young, was in an old tree very close to the gate. The engineer had erected a protective screen with sides and top at the danger spot and yet the attacks continued. Eventually the nurses became so frightened that they preferred to go the long way round by road rather than face the owl. When the young left the nest, the hole was cemented up to ensure that nothing of this kind would happen again.

In the 1950's I heard of two other cases of Tawny Owls in the Nottingham area making regular attacks on people near their nest-sites after dark, but unfortunately I have no record of the details.

A. DOBBS

[We have also received from Colonel H. Morrey Salmon a photograph which he took in Radnorshire in April 1952 of a Tawny Owl attacking the late Arthur Brook; this shows a similar scene to that published as plate 50 in the same issue as Jeffery Boswall's note. It now seems well established that some Tawny Owls become sufficiently aggressive when they have young in the nest to attack anybody who approaches and we do not propose to publish any further notes on this.—EDS.]

Needle-tailed Swift in Co. Cork.—At 08.05 GMT on 20th June 1964, as we were returning from Pointabullaun, the south-western extremity of Cape Clear Island, Co. Cork, we noticed a large, heavily-built swift which showed much white as it circled over West Bog. We watched it for ten minutes at ranges down to 20 yards through binoculars in clear sunlight until it disappeared for a time above the cliffs near-by, whereupon we wrote and compared field-notes. It reappeared for another ten minutes, circling over the bog again and passing within ten feet of us, and then soared over Pointabullaun for five minutes before climbing slowly SSW out to sea. Most of the time the light was behind us, so we had excellent views.

In appearance, it was a large, heavily-built swift, about the size of an Alpine Swift *Apus melba*, but stouter in the body, broader in the wings and shorter in the tail, which appeared stubby, almost square. P.A.W. noticed that, as the bird banked steeply, the tail was fanned out in a fashion similar to that of a drumming Snipe *Gallinago gallinago*. It had

a more 'fluttery' flight than European swifts of the genus *Apus* (though W.R.P.B. thought that the White-rumped Swift *A. affinis* flew rather similarly when he had a brief view of one at Tangier later in the year). The upper-parts and belly were grey-brown, with an iridescent greenish gloss in some lights, especially on the upper surfaces of the wings. The central forehead, chin and upper breast to the level of the 'shoulders' and the lateral and under tail-coverts were all white, forming a most conspicuous white face and horseshoe-shaped patch under the tail. Also, in the centre of the back, there was a very conspicuous pale greyish-white (in strong sunlight almost white) triangular patch, which had a well-defined transverse anterior edge in the centre of the mantle but which tapered posteriorly and merged into the rump.

Our first thought—that a swift showing so much white could only be an Alpine Swift—was immediately dispelled by a second look, as W.R.P.B. already knew that species well. Although we suspected that it was a Needle-tailed Swift *Hirundapus caudacutus*, an examination of the available textbooks did not immediately clinch the identification, since none mentioned the very conspicuous pale patch on the back. However, when W.R.P.B. visited the British Museum (Natural History) five days later, he found this feature present in many skins and particularly marked in some from the breeding range. Incidentally, it is also present in a British specimen from Ringwood, Hampshire, in July 1879 and can be seen in the published photographs taken by F. G. H. Allen and Irene Neufeldt in Australia and U.S.S.R. respectively (*Brit. Birds*, 53: plates 55-57).

Although it appeared so pale in the field, the back is actually greyish-brown in skins. These also usually have a greenish gloss, not blue as is sometimes reported for all but birds in fresh plumage, though some worn feathers show a blue iridescence. John Warham, who knows the species in its winter quarters in Australasia, confirms (*in litt.*) that it appears green in the field, although a slide which he has of a dead one also shows tinges of blue. He points out that, since the feathers are glossy, the colour will depend upon the angle of the light.

The weather was fine and settled and there seemed nothing to bring a vagrant so far out of its range at this time. It seems likely that it must have overshot its destination on return migration from Australasia to Siberia some time previously and then found its way to the southernmost part of Ireland in a subsequent southward movement.

This is the first Irish record of a Needle-tailed Swift. We wish to thank J. T. R. Sharrock for his interest in its verification. There appear to be only four previous acceptable records for Europe: single birds in Great Britain in July 1846, July 1879 and August 1931 and in Finland in May 1933. Although *The Handbook* and the *Field Guide* both refer to this species having occurred in Italy, on the basis of two

which were said to have been obtained from a small flock near Ravenna in May 1937, Dr. Edgardo Moltoni (per Dr. Sergio Frugis *in litt.* to I. J. Ferguson-Lees) has drawn attention to the fact that this record was later shown to be a falsification involving specimens imported from abroad (*Riv. Ital. Orn.*, 8: 76, 128; 18: 50-51).

P. A. WRIGHT and W. R. P. BOURNE

[A photograph by John Warham of a Needle-tailed Swift in flight in Queensland, Australia, is reproduced on plate 18a and illustrates some of the characters described here.—Eds.]

Reaction of Kingfishers to handling.—In the eight years 1958-65 I have handled a total of 56 Kingfishers *Alcedo atthis* in Berkshire, all full-grown individuals which have been captured in mist-nets. Some have subsequently been recaptured and this note is based on a total of 72 incidents. Although a Kingfisher may be very vocal in the net or during the brief process of extrication—uttering a loud staccato whistle which is often speeded up into a trill—a complete transformation of behaviour takes place once it is grasped in the hand.

Every Kingfisher I have handled has reacted in the following manner and always in complete silence. Firstly, it has stretched out its neck and pointed its bill upwards to within 30° of the vertical. It has then rotated its head very slowly through almost 180° to one side, then back again and to the same extent in the opposite direction, thus completing nearly a full circle. Once this head-turning has begun it has usually continued until the bird has been released, even if I have relaxed my grasp so that it has been lying on my open palm. I once timed one in this position and it was still performing at the end of three minutes; I suspect that it would have continued to the point of exhaustion if I had not let it go. Only one Kingfisher, an adult male on 8th March 1965, has shown any deviation from this stereotyped pattern and that involved a marked erection of the crown feathers in addition to the other actions.

The only comparable behaviour which I have observed in another species concerned a Green Woodpecker *Picus viridis* which was approached by a male Blackbird *Turdus merula* as it probed on a lawn. In that instance the woodpecker's stretching of the neck and rotation of the head were apparently effective as a threat display, for the Blackbird fled in noisy alarm although the woodpecker had shown no other aggression towards it. Unless someone has seen a Kingfisher rotate its head at another bird, however, I doubt whether 'threat display' is a satisfactory term to use in its case. Ringers will be familiar with many reactions from birds in the hand which apparently do not occur in other circumstances. Well-known examples include the trance-like state

into which warblers (particularly *Phylloscopus* and *Sylvia*) and other birds will go when held on their backs or lying in this position on one's open palm; the gaping of the Bullfinch *Pyrrhula pyrrhula* which is often accompanied by a harsh, grating call; and the screaming of the Great Spotted Woodpecker *Dendrocopos major*. The behaviour of the Kingfisher appears to be analogous with these and, since in nature the only comparable situation would be the initial grasp of a predatory bird or mammal, it seems to me that something like 'last resort distraction' would be a suitable term for it. W. D. CAMPBELL

[This behaviour of the Kingfisher is clearly a standard reaction. Dr. J. S. Ash informs us that all the Kingfishers he has handled in various parts of the country from Northumberland to Hampshire have done this and J. Crudass reports the same from Rye Meads, Hertfordshire. As Mr. Campbell points out, there are many other examples of specific reactions to handling, but perhaps the closest to this behaviour of the Kingfisher is the head-twisting of the Wryneck *Jynx torquilla*. In the case of that species, however, a similar display is triggered off when one is disturbed on the nest and various shakings and contortion of the head occur in courtship and other mutual displays. The Wryneck is also less stereotyped in that some individuals hardly show this reaction at all in the hand and many others do not do so continuously but instead may look alert or hang limp with closed eyes. Dr. N. Tinbergen suggests that the Kingfisher's behaviour may be a combination of 'freezing' and aposematic display, but clearly it needs further study.—EDS.]

Blackbird's nest under wing of car in regular use.—On 11th May 1965 the Taunton Motor Company supplied a new Austin A40 to Mr. and Mrs. D. H. Gardner of Runnington, near Wellington, Somerset. On 29th May the car was brought back for its first 500-mile service and the nest of a Blackbird *Turdus merula* containing one egg was found beneath the off-side wing. Plate 18b shows mechanic David Haines holding the egg by the nest exposed by the removal of the wheel on the jacked-up car. Mr. and Mrs. Gardner could offer no information about the building of the nest. Throughout the period concerned the car had been shut up each night in their garage which had no open windows or other access. It had been used daily to cover the eight miles to and from Taunton and also in the course of the day except for periods of two to three hours when it was parked in a municipal car park. E. R. COLES

Dusky Warbler in the Isles of Scilly.—On 19th October 1964, in the orchard on St. Agnes, Isles of Scilly, we discovered a leaf warbler

creeping through the base of a nettle bed. Its uniform dark brown plumage, conspicuous creamy-white superciliary and habit of keeping to the ground suggested something unusual, whilst the call-note—a frequently repeated low *chak*—was quite unlike that of most *Phylloscopus*. The bird disappeared from view, but was soon found again when it was heard calling from the bottom of some pittosporum bushes. Here it spent most of its time feeding amongst the leaf litter, occasionally perching on dead cow parsnip stems. In its habits it was far more reminiscent of an *Acrocephalus* warbler than a *Phylloscopus*. A mist-net was erected and the bird was soon trapped. The following is a summary of the detailed description that was taken:

Upper-parts: forehead, crown, lores, nape and back very dark olivaceous-brown; ear-coverts dark buff, mottled with dark olivaceous-brown; pronounced buffish-white superciliary from nostrils to nape, becoming broader and buff-coloured behind the eye; very dark stripe through eye. *Wings*: feathers very dark olivaceous-brown fringed with pale buffish on the inner webs. *Tail*: very badly abraded, dark olivaceous-brown and slightly rounded (outer pair of feathers 5 mm. shorter than central pair). *Under-parts*: throat whitish and belly buffish-white, becoming darker buff at sides in each case; flanks dark olivaceous-brown; under tail-coverts and under wing-coverts buff. *Soft parts*: upper mandible dark brown, lower mandible yellowish-horn with dark tip; whitish cutting edge to bill; three rectal bristles; inside of mouth lemon-yellow; eye dark brown; legs pinky-brown in front, but yellowish behind; soles of feet mustard-yellow. *Measurements*: wing 56 mm.; tail 46 mm.; tarsus 22 mm.; bill 11.5 mm.; weight 9.0 grams (13.15 hours). *Wing-formula*: 4th and 5th primaries equal and longest; 6th 1.5 mm. shorter; 3rd 2 mm. shorter; tip of 2nd between 9th and 10th; 1st 11 mm. longer than primary coverts; 3rd, 4th, 5th and 6th emarginated; no notch on inner web of 2nd; slight notch 18 mm. from tip on inner web of 3rd; well-defined notch 16 mm. from tip on inner web of 4th.

On this description the bird was identified as a Dusky Warbler *Phylloscopus fuscatus*, the third record for the British Isles and the first for the Isles of Scilly. The slim bill, the absence of any notch on the inner web of the second primary, the dark plumage, the general field characteristics and the call-note ruled out Radde's Warbler *P. schwarzi*; B.P.A. is also familiar with this latter species having examined the one at Dungeness, Kent, in October 1962 (*Brit. Birds*, 56: 420-421).

B. P. AUSTIN and B. S. MILNE

Dunnock eating haws.—On 9th September 1965, in Hatfield Park, Hertfordshire, I watched a Dunnock *Prunella modularis* eating the berries of a large hawthorn *Crataegus monogyna*. The bird was in full view on the edge of the tree and the plentiful berries were of approximately the normal 8 mm. diameter. It swallowed them without any preparatory pecking for about five minutes, during which time it ate

perhaps 20 berries and gave the impression of excited gobbling. *The Handbook* mentions no berry food for this species. S. G. BANKS

[I have seen Dunnocks eating haws on at least two occasions in the course of a six-year study of this species near Crowhurst, Sussex, during 1950-56, but it does not seem to be common and it is interesting that a fairly small passerine can swallow such large food items without difficulty.—I.J.F.-L.]

Regular colony of House Sparrows in exposed sites.—During 1961-64 we paid intermittent visits to South Cerney, Gloucestershire, where a small colony of eight to ten pairs of House Sparrows *Passer domesticus* nest each year on exposed electric cable brackets fixed to the front walls of several houses on either side of a fairly busy road. Residents at South Cerney informed us that this type of breeding site has been in regular use there for at least 25 years. As shown in plate 21b, the brackets are a little below the eaves and the nests are otherwise typical, loosely built, domed structures. Although House Sparrows frequently build exposed nests in trees, these usually get plenty of natural cover in summer. Exposed nests on houses may not be uncommon, but we cannot trace any published record of a colony nesting in such sites year after year.

Details of the colony, together with several photographs, were forwarded to Dr. J. D. Summers-Smith, author of the monograph on *The House Sparrow* (1963), and he commented as follows: 'I found the photographs of the House Sparrows' nests most interesting. I cannot recall having seen anything like this before. Open nests of this sort are usually in trees where they get more support from the branches and also some cover from the foliage.'

BERNARD KING and J. G. RESTALL

House Sparrow carrying live nestling.—The note by W. G. Luton on a House Sparrow *Passer domesticus* carrying a dead nestling and the accompanying comment by Dr. J. D. Summers-Smith about this species carrying live nestlings (*Brit. Birds*, 58: 443) prompt me to record an incident observed in Imperial Drive, North Harrow, Middlesex, at about 8.30 p.m. on 12th July 1962. While walking past a house near the Ridgeway with my wife and father-in-law, I saw a female House Sparrow fly from a nest in the roof. In her bill she was carrying a very small nestling by the lower end of its neck. She deposited this nestling on the low brick wall fronting the garden of the house and flew up to a small tree only four feet away and not more than five feet from us. The nestling was still alive and, as it had no feathers and its eyes were not yet open, we presumed that it had only recently been hatched.

We could hear other young calling in the nest from which it came, but we did not attempt to examine the nest. On our return about 1½ hours later, the nestling was still on the wall but was now dead and being over-run by small red ants. R. CHARLES LONG

[It is impossible to suggest reasons for this behaviour, but it is interesting to note that there were other young in the nest. Letters on 'Birds carrying dead nestlings' appear on pages 119-120.—EDS.]

Reviews

Advances in the Study of Behavior. Edited by Daniel S. Lehrman, Robert A. Hinde and Evelyn Shaw. Volume 1. Academic Press, New York, 1965. 320 pages. 76s.

This book is of wide general interest but contains two chapters, both of them by workers at Duke University, North Carolina, which are the particular concern of ornithologists.

Firstly, P. H. Klopfer and J. P. Hailman have written on 'Habitat Selection in Birds'. They provide new experimental evidence which throws light on the way in which birds choose suitable habitats for their breeding and they discuss the environmental cues which are essential to this choice. Thus adult Chipping Sparrows *Spizella passerina* show a preference for pine foliage as compared with oak leaves. Rearing young without sight of foliage fails to abolish this preference, but rearing them among oak leaves decreases the proportion of time the young spend in pine. Later, however, at an age of four to six months, all these birds show the normal adult preference for pine, irrespective of their early experience.

Secondly, Klaus Schmidt-Koenig has contributed a long discussion on 'Current Problems in Bird Orientation'. He ranges widely and learnedly over various aspects of the subject and is highly critical of nearly all previous work in this field. Unfortunately, he often fails to specify his reasons for rejecting some conclusions and accepting others. He states that 'the present view is based largely on a statistical reconsideration of published data'. He then mentions a number of modern statistical techniques which he claims to have employed, but he seldom makes clear exactly how, and in what respects, the work he criticises reaches, or fails to reach, the required standards. A very large number of the studies which he considers have to be expressed in the form of

'circular distributions'. He emphasises the difficulty in dealing with such distributions by existing statistical methods, and at one point makes a rather damaging admission with the following words: 'though it is admittedly difficult, if not impossible, at the present moment to deal with bi-modal circular distributions, a number of diagrams given in the various papers have yet to be demonstrated to be bi-modal rather than widely scattered or random'. The study is highly technical in approach—as, indeed, the subject demands. Unfortunately, it does not provide the balanced and judicious summary which would be so valuable and interesting for the general ornithologist. One gets the impression that in places the author cannot see the wood for the trees and several of his many graphic illustrations lack the detailed legends necessary to make them readily comprehensible. While this paper may well prove valuable and stimulating to those working in this field, its value to others will be strictly limited. Like the other chapters, however, it provides a comprehensive reference list which is most valuable.

W. H. THORPE

Nordens Fugle i Farver. Part VII. Systematisk Oversigt over Nordens Fugle. By Finn Salomonsen. Munksgaard's Skandinavisk Bogforlag, 1963. 460 pages; 66 coloured plates; one map. Sw. Kr. 546 for the seven volumes (orders accepted for the entire work only).

Under review is the seventh and concluding part of the comprehensive *Nordens Fugle i Farver* (*Norden's Birds in Colour*) recently published in Denmark with Niels Blædel as editor. The text of the previous six volumes consists of accounts of northern birds written by distinguished Scandinavian ornithologists in that attractive narrative style so often dismissed as 'popular', and beautifully and lavishly illustrated by colour-photography. Dr. Salomonsen is alone responsible for the final volume, which is undoubtedly one meriting notice at length. In it will be found details of the local distribution and status of every bird recorded in Norden, under which general heading the author includes Greenland, Jan Mayen, Iceland, Svalbard (Spitsbergen) and the Faeroes, as well as Fenno-Scandia. All available records of the scarcer visitors are also quoted and, in some cases, analysed. Regional information is supplemented by short, more general paragraphs on field-characters, biotope and range beyond Norden.

As Dr. Salomonsen points out in the most helpful introductory chapter, the area under survey extends from the High Arctic Zone to the Central Boreal Province—in other words from the lichen-tundras of Greenland and Svalbard to the highly-cultivated farmlands of Denmark. It can hardly surprise, therefore, to learn that the avifauna totals 605 Palearctic and Nearctic forms. Many of these, however,

must rank as only accidental vagrants and more than sixty have been recorded but the once. As might be expected, a widely-distributed species may be represented by several racial forms. Dr. Salomonsen recognises four races of the Bean Goose, five of the Eider, six of the Ptarmigan and seven of the Black Guillemot. All five redpolls appear under *Carduelis flammea*, with *holboellii* as a mutant of the nominate race; hybrids between *flammea* and *exilipes* have been obtained in arctic Norway and Sweden, and the latter mates freely with *islandica* in Iceland, while *bornemannii* and *rostrata* sometimes interbreed in Greenland. Dealing with that notoriously difficult group, the yellow wagtails, the author notes that while *flava* rarely mates with *thunbergi* in either Sweden or Norway, mongrels between the two predominate over southern and central Finland and occur throughout the northern regions of that country. The Bluethroats of the subarctic Norwegian highlands are not regarded as differing sufficiently from those in Lapland to justify the retention of Kleinschmidt's race *gaetkei* and the characters on which Stejneger based his west Norwegian races of the Wren and Willow Tit (*bergensis* and *colletti*) are also dismissed as too slight and unstable.

When assessing reported occurrences of rarities, Dr. Salomonsen demands of others those high standards he himself has always observed. Several records accepted by some authorities are discarded, and others included with the qualification 'probably'. While in no wise reflecting on the competence of the observers concerned, the author reminds us that sight-records alone cannot suffice in the case of *races* of such birds as the Lesser Short-toed Lark, the Desert Wheatear and the Olivaceous Warbler. He cannot ignore the possibility of confusion with *thunbergi* in any of the Scandinavian records of the Black-headed Wagtail (*feldegg*); and, in his opinion, a Swedish yellow wagtail referred to *taivana* may well be a hybrid between *flava* and *flavissima*; while those reported from Finland as *lutea* are more likely to be aberrant examples of *flava*. Details of dubious records, with the reasons for their rejection, are given in one of two appendices, the other being devoted to occurrences based on birds which have escaped from captivity or been deliberately introduced.

Dr. Salomonsen very rightly attaches considerable importance to variations in numbers and distribution, and the data at his disposal have sometimes enabled him to trace the history of a species over a century or more. To quote but once, the southern race of the Cormorant (*sinensis*) colonised Denmark in 1775, but failed to maintain a footing; made a second and more successful attempt in 1810, only to desert all its local breeding-stations about 1876; and finally returned in 1938. Records all tend to show that such variations in status may be looked for in periods of climatic amelioration or deterioration. This

may be true of even a so-called 'accidental' visitor and it is interesting to read that the bulk of the trustworthy Scandinavian records of two Siberian thrushes—the Black-throated Thrush *Turdus ruficollis atrogularis* and the Dusky Thrush *T. naumanni eunomus*—are concentrated within two exceptionally cold decades.

Striking changes in the bird-life of many parts of Norden become apparent during the last 'warm period', the thirties and forties of the present century. A number of species—amongst them the Red-crested Pochard, the Collared Dove, the Grasshopper Warbler, the Greenish Warbler, the Red-breasted Flycatcher and the Serin—then bred for the first time in either Denmark or Sweden, while others reoccupied old haunts and many already well-established further extended their zones of distribution. A number of the less regular vagrants have also come under notice more frequently of late. To mention only four species, all the Fenno-Scandian records of the Lesser Kestrel and the Scops Owl fall into the period 1943-61; only two of the twelve Woodchats reported there occurred before 1932; and twelve of the seventeen Lesser Grey Shrikes wandering to Sweden did so between 1953 and 1960.

On the other hand, the same decades have witnessed a marked contraction in the ranges of some northern birds, such as the Three-toed Woodpecker, the Siberian Tit and the Brambling. Ivory Gulls have meanwhile appeared less frequently along the Norwegian coasts, two detected in 1932 being the first recorded for nearly thirty years, while in the Faeroes none has been seen since 1901. Within the last few years, with their cold springs, there has been a tendency on the part of some species to return to territories from which they had withdrawn. In 1955 the Brambling bred in some of its old stations in central Sweden and Finland, and the Waxwing and Pine Grosbeak have since nested to the south of their previously known limits in Norway. Since Dr. Salomonsen's pages went to press, it may be added, small colonies of breeding Brünnich's Guillemots have been located in arctic Norway.

The coloured photographs selected as illustrations are all well reproduced, and some are most attractive. An error seems to have occurred in the caption of the plate facing page 202, which surely portrays the nest and eggs, not of a Red-necked Phalarope, but of a stint.

Dr. Salomonsen's account of the avifauna of Norden has clearly been compiled with that regard for accuracy and attention to detail which we have come to expect of its distinguished author. The reviewer will certainly not be alone in venturing to hope that some way can be found of satisfying the need for an English edition of so outstanding a contribution to the ornithology of this region.

H. M. S. BLAIR

Letters

Birds carrying dead nestlings

Sirs,—With reference to the recent note by W. G. Luton on a House Sparrow *Passer domesticus* carrying a dead nestling, and the accompanying editorial comment (*Brit. Birds*, 58: 443), I am rather surprised that this practice should in any way be considered unusual. Every summer I expect to find a number of corpses of unfledged passerines on my lawns at Hartest, Suffolk. I have always assumed that they have been dropped there by the parent birds as part of normal nest-sanitation, in the same way that egg shells and faecal sacs are removed and dropped some distance from the nest.

As to actual evidence of the practice, however, I can quote only two examples from personal observation. In one case, several summers ago, a small corpse fell close by me as I stood on the lawn; a number of House Martins *Delichon urbica* were flying about overhead and, although I did not see one of them actually drop the body, the corpse was that of a young House Martin. On the second occasion, which occurred in the summer of 1965 just as I stepped out of the back door into the stable yard, a House Sparrow flew out from the eaves overhead and dropped the rather stale corpse of an unfeathered nestling a few yards from me; I could plainly see that it was carrying the body in its beak and not in its feet or between its legs.

It would be interesting to know how parent birds locate dead nestlings which would soon be trampled into the bottom of the nest by the remainder of the brood.

WILLIAM H. PAYN

[I agree that small nestlings are frequently found dead well away from nests and I have long assumed that unfeathered young are removed if they die while older ones are left and become trampled into the bottom of the nest by the rest of the brood. Certainly this is the case with the Dunnock *Prunella modularis* and I have twice seen dead nestlings, and once a live one (?by accident), removed from nests of this species which I have been watching from hides. Among our reasons for publishing Mr. Luton's note, however, were his belief that the corpse was not carried in the bill and to give an airing to Dr. J. D. Summers-Smith's interesting comments on the transportation of live young (in which connection see the note on 'House Sparrow carrying live nestling' which is on pages 114-115). To get a broader view of all this we consulted H. Mayer-Gross, organiser of the British Trust for Ornithology's Nest Record Scheme, and he has contributed the following letter.—I.J.F.-L.]

Sirs,—The chance of seeing a parent bird remove a dead nestling must be small unless intensive observations are being made from a hide. With most altricial species, however, it is common to find that one or more young disappear from a brood in the early stages. These cases are highly unlikely to be due to predation, since predators usually take the whole brood, and it therefore seems safe to assume that any small nestlings which die (and perhaps also ones which become very weak) are removed by the parents. In my experience it is the exception to find that an *unfeathered* dead nestling has been trodden into the lining by the rest of the brood; it is very much commoner for the brood size simply to decrease between one visit and the next. (Nest Record Card analyses show that nests found with well-grown broods average fewer chicks than ones found soon after hatching; broods evidently get reduced, therefore, even when there is no human interference. This suggests that an observer's visit is not the normal reason for such nestling-removal as was described for A. H. Scott's House Sparrows, in *Brit. Birds*, 58: 443; in any case, of course, a great many broods survive undepleted despite frequent handling.)

On the other hand, if a brood is already well-grown when one youngster dies, the body is often if not always left in the nest; the most obvious explanation is that the parents are not strong enough to drag it over the edge. In this connection, it may be relevant that one sometimes finds the body of a *medium-sized* chick *beside* a nest in a box, presumably because it could be pulled from the nest but not lifted up to the entrance hole. However, it may also be that a dead nestling whose feathers have already emerged is not distinguished by the adults from its live nest-mates and therefore no attempt is made to treat it as foreign matter. Furthermore, at about the time when the young are becoming well-feathered nest-sanitation ceases or tends to be confined to the removal of faecal sacs deposited on the nest rim, so that bodies at the bottom of the nest could simply go 'unnoticed'.

H. MAYER-GROSS

Hole-nesting by Guillemots

Sirs,—Cavity-nesting by Guillemots *Uria aalge* is much more widespread in the British Isles than might be inferred from the note by Susan Fogden and Jeremy Greenwood (*Brit. Birds*, 58: 470). Surprisingly little mention of the habit is made in the standard works, though *The Handbook* does contain a rather ambiguous statement to the effect that eggs are occasionally laid 'in crevices'. However, a hasty examination of some of the regional British literature shows that Guillemots nest, or have nested, in holes or deep crevices in the sides of cliffs at Fowlsleugh, Kincardineshire, and Ramna Stacks, Shetland,

and also in holes among ruined buildings on the Bass Rock (Baxter and Rintoul 1953), in a deep horizontal fissure on the cliffs of Lambay Island, Co. Dublin (Hart 1883), inside a 'pocket' in the cliffs on the north coast of Jersey (Dobson 1952), and beneath boulders in the Isles of Scilly (King 1924, Ryves 1948). In addition, my attention has been drawn by Mrs. Susan Cowdy to an interesting account by Gilbert and Brook (1931) of cave-nesting Guillemots on the Pembrokeshire coast. They describe two or three caves in cliffs in which the species was nesting on the cave floors, and also a further vast cave, 'as large as a cathedral', near the Stack Rocks where dozens of Guillemots were nesting on the ledges inside.

Underground nesting by Guillemots is therefore not all that unusual and a more extensive search of the literature would doubtless produce further examples. Dr. M. P. Harris has informed me of at least one such site on Skomer, Pembrokeshire; Peter Davis and C. S. Waller (*in litt.* to the editors of *Brit. Birds*) mention that about 30 pairs nest among and beneath the debris of an old cliff fall in the entrance to a cave at Sauverstein on the north coast of Fair Isle; and Peter Davis points out that the species also nests in cavities elsewhere on Fair Isle, as well as in similar situations on Lundy, Devon, and Unst, Shetland.

The position in the Isles of Scilly is rather different to that at the other localities mentioned above, for here it is the majority of the local Guillemots that nest underground beneath boulders, though some do nest on the few suitable cliff ledges or in fissures in cliffs. Unlike the Razorbill *Alca torda* which breeds on almost all the outlying rocky islets in Scilly, Guillemots are largely confined to a few of the higher of these, such as Men-a-vaur, Scilly Rock and Gorregan. On four-acre Gorregan, for example, I found about 50 breeding pairs in 1962, about six of which were nesting sparsely on a more or less open but sloping ledge, and a similar number in a horizontal crevice extending several feet into, and about 20 feet up, the same cliff face. The remainder were nesting in small groups, often some distance from the sea, deep down among the cavernous hollows which are such a feature of this boulder-strewn island. These deeper hollows are largely shunned by Razorbills and Shags *Phalacrocorax aristotelis* and it is possibly only in the absence of competition from these species that Guillemots use cavity nest-sites on the higher, remoter islands in Scilly. Open nest-sites were evidently more common earlier this century, for Robinson (1920), referring to a decrease in the species in Scilly between 1911 and 1914, noted that their eggs 'exposed as they are in the open . . . are eaten wholesale by the big gulls'. The present occupation of cavity-sites by breeding Guillemots in Scilly may therefore be due not only to a shortage of suitable cliff ledges but also to increased predation by the larger gulls on eggs laid in all open sites.

J. L. F. PARSLow

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News and comment

Edited by J. L. F. Parslow

National Nature Week.—Probably no further reminder is necessary that next month will see the Council for Nature's well publicised second National Nature Week, to be held from 23rd to 30th April. Local natural history societies, county naturalists' trusts and other similar bodies throughout the country will be setting up nature trails, staging exhibitions and putting on special lectures and film shows. An official programme of events is to be published in the April issue of *Mainly about Wildlife and the Countryside*, a new monthly magazine aimed primarily at school-children to be published by *The Countryman*, 10 Bouverie Street, London E.C.4. In London, main interest will centre on the *Observer Magazine* Wild Life Exhibition to be held at Alexandra Palace from 21st April to 1st May (daily, 10 a.m. to 9 p.m.), which is to be opened by the Duke of Edinburgh.

Formation of Irish Wildfowl Committee.—In recent years populations of wintering wildfowl and waders in Ireland have been coming under increasing pressures from several different factors, notable amongst which has been the drainage of important habitats. Further schemes to drain or otherwise alter several more major wildfowl wetlands have been proposed. Especially in view of these recent developments, an Irish Wildfowl Committee was formed in Dublin on 4th December 1965 with Professor W. Finlay as chairman and David Cabot as honorary secretary. The Committee, which includes a number of well-known Irish ornithologists, has been set up in association with the Irish Society for the Protection of Birds and will seek co-operation from government departments and wildfowling interests in Ireland, as well as from the Wildfowl Trust and from international bodies concerned with wildfowl conservation.

Among the Committee's first tasks will be the preparation of lists of all major wildfowl wintering areas in Ireland, including those recently lost to drainage and those which are scheduled to be drained, together with details of the species found in each, their feeding ecology and, where appropriate, the subsequent effects of drainage schemes. The Committee will also organise census work and the collection of wildfowl distribution data. Investigations into the status of four species—Brent and Grey Lag Geese, and Whooper and Bewick's Swans—have already begun. Following these initial surveys a conservation plan will be drawn up, and it is hoped that sufficient funds will eventually be raised to enable some of the more important

areas to be purchased as wildfowl reserves. Anyone interested in wildfowl and nature conservation in Ireland is invited to become an associate member (one guinea per annum). Further details can be obtained from the Committee's honorary secretary, Department of Zoology, University College, Galway.

Lindisfarne National Nature Reserve.—The Nature Conservancy have announced a large extension to the Lindisfarne Reserve in Northumberland, the first part of which was established in September 1964. The lease of a further 5,703 acres brings the total area covered by the reserve to 7,378 acres, and it now extends over the sands and mud-flats from Goswick Sands to Budle Bay, with a further strip to the north-west between Cheswick Black Rocks and Cheswick Sands. The whole area is the main refuge in north-east England for migrating and wintering wildfowl and waders (for fuller details see *Brit. Birds*, 57: 475) and the sanctuary areas of the reserve will form part of the network of National Wildfowl Refuges now being established up and down the country. The traditional sport of wildfowling (including punt-gunning: a record bag of over 100 Wigeon was killed with a single shot in the area recently) is to be allowed to continue over much of Holy Island Sands and Fenham Flats, but will be restricted to permit holders.

The food of London's Tawny Owls.—An interesting study by Dr. G. Beven of the food of Tawny Owls in the London area is published in the latest issue of *The London Bird Report* (No. 29, from Mrs. L. M. P. Small, 13 Woodfield Crescent, Ealing, London W.5, price 8s. 3d. post free). An examination of pellets collected throughout the year in three widely separated and markedly different habitats made it possible for a quantitative comparison to be made of the main food items at each locality. Dr. Beven shows that mammals are taken where available, but that where they are not the owls readily turn to birds. Thus at Holland Park, in central London, birds formed about 93% (by weight) of the vertebrate prey, whereas 20 miles away on the outskirts, in an oakwood at Bookham, birds formed only 10% of the owls' diet. In between these two areas, suburban Tawny Owls at Morden took birds and mammals in about equal numbers. Unexpected prey revealed by the pellets included a Whiskered Bat at Bookham and frog and goldfish at Holland Park.

Wall charts of birds.—Three wall charts featuring 'small birds' have recently been issued by Educational Publications Ltd., East Ardsley, Wakefield, Yorkshire; a fourth in the same series is due shortly. The series is agreeably different from most other ornithological wall charts, each 'chart' being in effect a single picture in which the scenery plays as attractive a part as the birds themselves. None portrays more than eight species, all of which are passerines (mostly males) except for a partridge in Chart 2. Chart 1 shows a number of garden birds at a bird-table, while the other two depict various scrub, woodland or open country species in more natural, summer surroundings. The paintings evidently originated from abroad (the birds' names are given in five European languages, including English) and though a few of the species depicted, such as a summer-plumaged Ortolan Bunting, seem rather inappropriate for schoolchildren in this country, their inclusion scarcely detracts from the decorative and educational value of the pictures. Each is reproduced accurately in full colour, measures 30 inches by 40 inches, and costs 12s.

International photographic competition.—The Sociedade Portuguesa de Ciências Naturais have announced an international photographic competition, limited to subjects dealing with botany, zoology, geology and geography. An entry fee of U.S. \$2 will allow foreign competitors to enter up to five works in each of ten sections, which include colour slides, colour prints and amateur cinematography. Awards will include cups and medals and also cash prizes totalling about

\$1,000. Further details and entry forms can be obtained from the S.P.C.N., Faculdade de Ciências de Lisboa, Rua da Escola Politécnica 58, Lisbon 2, Portugal. The closing date for entries is 30th April 1966.

Release of marked Monarch Butterflies.—Last September (*Brit. Birds*, 58: 390) we included a request for sight-records of tagged Monarch Butterflies, several hundred of which were to be sent from Canada for release in England in connection with a study into the orientation of this highly migratory North American species. In the event only 50 were received, all but one of which were released near Clevedon (Somerset) on 6th September. None of these was actually recovered, but during the next three weeks J. F. Burton, who organised the experiment, received reports of 11 apparently genuine sightings from places as far away as Barnstaple (Devon), Havant (Hampshire) and Kettering (Northamptonshire). The only one to be released elsewhere, at Richmond Park (Surrey), was also the only one actually recovered—at Richmond, where it was found dead 12 days later.

Recent reports

By I. J. Ferguson-Lees

(These are largely unchecked reports, not authenticated records)

This brief summary is primarily concerned with January and February 1966. Several American species included an **American Wigeon** *Anas americana* on the Moray Firth near Inverness from 30th December well into February; a male **Surf Scoter** *Melanitta perspicillata* at Southernness Point (Kirkcudbrightshire) to at least 19th February; and either two or three **American Robins** *Turdus migratorius* at Poole Harbour (Dorset) on 15th and 16th January, at Canford Cliffs (Dorset) for several weeks from mid-January (perhaps the same individual as the first), and in Windsor Great Park (Surrey part) from 12th to 23rd February. In this connection, it is interesting that in January a number of **Lapwings** *Vanellus vanellus* crossed the Atlantic the other way and parties or singletons were seen in 17 places in Newfoundland, St. Pierre, Miquelon, Prince Edward Island, Nova Scotia, New Brunswick and Quebec, the most since 1927 (see *Brit. Birds*, 22: 6-13, 43). A **Cory's Shearwater** *Procellaria diomedea* was found dead at Salthouse (Norfolk) on 29th January; this proved to be of the North Atlantic race *borealis* and is the first one to be subspecifically identified here since both the Mediterranean and North Atlantic races were deleted from the British and Irish List at the time of the Hastings Rarities (*Brit. Birds*, 55: 281-384). Other less common birds in the period included **Ferruginous Ducks** *Aythya nyroca* in Devon and Huntingdonshire; and **Black-bellied Dippers** *Cinclus c. cinclus* at Maidstone (Kent) and Stanford Water and Aylsham (both Norfolk) between end-November and mid-February. **Bearded Tits** *Panurus biarmicus* (58: 527-528) stayed on to winter in many parts of England north to Lancashire and west to Devon and Cornwall, and some were even found in Ireland in January.

Bewick's Swans *Cygnus bewickii* reached a peak of nearly 600 on the Ouse Washes in February and there were parties of up to 30 or 40 in many counties of southern England. A widespread wreck of **Shags** *Phalacrocorax aristotelis* in East Anglia in December and January, as usual involving the population from south-east Scotland and north-east England, was heralded by a considerable passage down the east coast in mid-November (e.g. 129 at Spurn, Yorkshire, on the 21st); some

occurred inland to Leicestershire and Buckinghamshire. Such waders as **Green-shanks** *Tringa nebularia* and **Spotted Redshanks** *T. erythropus* were reported wintering, particularly in the west between Lancashire and Cornwall, and three **Curlew** *Sandpipers* *Calidris ferruginea* in Lancashire, but wintering **Chiffchaffs** *Phylloscopus collybita* and **Blackcaps** *Sylvia atricapilla* were rather below normal. This was quickly put right, however, by an unusually early arrival of **Chiffchaffs** north to Isle of Man and Yorkshire during 3rd to 6th March; the first **Wheatears** *Oenanthe oenanthe* and **Sand Martins** *Riparia riparia* started to come in at the same time. I must also mention a **Swallow** *Hirundo rustica* at St. Ives (Cornwall) on the unusual date of 2nd January.

Obituary

Wilfrid Backhouse Alexander (1885-1965)

AS WAS BRIEFLY recorded in our January issue, Wilfrid Backhouse Alexander died at Parkstone, Dorset, on 18th December 1965. He was one of the new team of editors who took up the task of running *British Birds* after the early death of his friend B. W. Tucker almost exactly fifteen years before. Although we therefore think of him first as a valued colleague, this was in fact simply the closing activity of a long, varied and fruitful career.

'W.B.A.', as he was generally called, was born on 4th February 1885 at Croydon. Between the ages of ten and twenty-seven, however, his home was at Tunbridge Wells. With the late C. J. Alexander, who died at Passchendaele in October 1917, and H. G. Alexander, he was one of perhaps the most remarkable trio of brothers who have ever served British ornithology; at this stage of their lives they owed much to the inspiration and instruction of their two maternal uncles, of whom James Crosfield was primarily interested in birds and Albert Crosfield in plants. While at school, first at Bootham School, York, and then at Tonbridge, W.B.A.'s interest in birds was pronounced, but botany won him over during his Cambridge days (which led to a first class in Natural Sciences in 1909), and for some three years afterwards. Two of these years he spent also at Cambridge, but during the third he served as an assistant naturalist in the international exploration of the North Sea. In 1912 he left England for a museum appointment in West Australia, where his interest in birds revived. He stayed in Australia for nearly fifteen years, the last third of which were spent in one of the classic achievements of the biological control of pests, the campaign against the prickly pear.

In 1926 he returned to England, undertaking various assignments, the most notable being the publication in 1928 of his *Birds of the Ocean*,

which we now see not only to have been largely instrumental in opening up the neglected field of marine ornithology, but also as the first of the brilliant family of modern pocket field guides which have so transformed the art of bird-watching. He also served for a year or so as superintendent of the Marine Biological Association's survey of the Tees Estuary.

Unknown to him at the time, events in Oxford were then rapidly shaping a new situation in British ornithology which was to determine his future life. In February 1927, through the initiative of its then secretary V. C. Wynne-Edwards, the Oxford Ornithological Society started the Oxford Bird Census under its two vice-presidents, B. W. Tucker and myself. I acted as director until my departure from Oxford in 1929 created a gap which was filled, largely through the good offices of J. C. F. (later Sir John) Fryer, by obtaining grants for a three-year period from the Empire Marketing Board and the Ministry of Agriculture. These, together with private sources, provided an income of £500 a year. The Bird Census was then given free accommodation in the Department of Zoology and placed under the supervision of a strong advisory committee headed by the Linacre Professor E. S. Goodrich. The initial results of the Bird Census had already opened up impressive possibilities. It had run successfully in Christ Church Meadow the first collectively organised bird-marking station in the British Isles; its census of Rookeries over 224 square miles had done some pioneer work on the relation of bird populations to food and territory; its University Farm census over 300 acres had counted and mapped a substantial bird population over successive years of agricultural change; and its census of local Heronries had inspired and helped to support the national census of Heronries in 1928. The quest now was for someone who would carry on these varied and exacting activities with the enthusiasm of an undergraduate and the skill of an experienced scientist, and who would play a full part in developing out of them a permanent Institute of Ornithology backed by a national co-operative organisation for the pursuit of field ornithology.

It was, I think, Fryer who suggested the possibility that W. B. Alexander (whose name was then hardly known in Oxford) should be brought down from the Tees to fill this not very modest requirement, and in October 1930 he was and he did. By a frighteningly narrow margin the project was thrust through just in time to avoid being destroyed, as it otherwise certainly would have been, by the Treasury cuts of 1931, but even so it started life partly crippled by a financial stringency which would scarcely have been tolerable to a character less equable than W.B.A. or to any married man. This is not the place to tell of the intense and complicated activities which followed and in which W.B.A. played one of the chief parts. But they saw the infant project develop

first into the Oxford University Research in Economic Ornithology (including the Oxford Bird Census) in 1931 and then, on the advice of a sub-committee consisting of W.B.A., B. W. Tucker and myself, shape a course towards the early formation of a national representative council which would set up a chain of organised bird-watchers to undertake co-ordinated research throughout the British Isles and would establish at or near Oxford the nucleus of an independent national headquarters for field ornithology. This sub-committee's report, in August 1931, noted among other things that W.B.A. 'is a Vice-President of the Royal Australasian Ornithologists' Union and his exceptional connexions with American and other foreign workers are of special value in keeping abreast of contemporary research'.

In fact, it was not until much later that the full range of W.B.A.'s qualifications for the assignment became fully apparent. The project was then much dependent on maintaining the interest and keenness and training the minds of undergraduates and others of like age, and W.B.A. demonstrated to the university world how a small research unit in a hitherto widely despised branch of learning could give a worthwhile stimulus to students. On this side his partnership with Bernard Tucker was at its happiest, and without it the essential base for subsequent ornithological developments within the university would have been lacking. W.B.A. was also not only broadly experienced and equipped with contacts world-wide, but, in addition, was something much more than just an ornithologist. We can now recognise him as a trained environmental scientist, at home in applied biology on land and at sea, and thus well qualified to save the Oxford approach from becoming, as it otherwise might have, a blinkered or parochial affair. Another quite unexpected and outstanding contribution of W.B.A.'s at this period was his fruitful use of his position to stimulate and develop the embryonic British bird observatory movement towards an assured and leading status. This was perhaps his most personal and spontaneous contribution, lit up by his good-humoured enthusiasm and lifted by his unfailing patience and readiness to do anything and to go anywhere to help.

He faithfully carried through the outstanding work of the census of Rookeries and the bird population of University Farm and he devoted immense care and effort to refining and improving the Index of Heron Population, thus demonstrating both his conscientiousness and the modest humility with which he put his talents at the service of ornithology. Co-operative inquiries were not really congenial to him, but he nevertheless assumed responsibility for, and in the end duly reported on, the Woodcock Inquiry which was one of the first to be launched by the British Trust for Ornithology.

One of the original concepts of the Institute of Ornithology was that

it should gradually develop an outstanding national library of ornithology, and here again was a field in which only some time after his engagement did it become evident that the ideal man had been chosen for the task. W.B.A. had an immense love and understanding of books, and he soon made what later became so justly the Alexander Library his own special care and outlet for his generosity. He continued to look after it as librarian for a full decade after he had relinquished to David Lack the directorship of what he had meanwhile built up into the Edward Grey Institute of Field Ornithology in Oxford University. One more of his important contributions which must be recorded was his ready assumption, on the sudden death of F. C. R. Jourdain, of responsibility for the sections, especially on 'Distribution Abroad', which Jourdain had contributed in the earlier volumes of *The Handbook of British Birds*.

It was perhaps characteristic of his willingness to fall in with the plans and to fill out the work of others that, apart from his path-finding *Birds of the Ocean*, his only hard-cover book should have been a new and revised edition in 1948 of *British Birds in their Haunts* by the Rev. C. A. Johns. Two of his major contributions to this journal were made in collaboration, first with David Lack in 1944-45 on 'Changes in status among British birds' and secondly with R. S. R. Fitter in 1955 on 'American land birds in western Europe'. In January of the following year he had a stroke and retired to Swanage in Dorset where I was occasionally able to see him and to reminisce with him about the past.

His record stands as that of one without whom the modern revolution in British ornithology might well have proved abortive. He did not seek or claim to be brilliant or original or dominating, and I must confess that during the most critical and formative times he often struck me as a most agreeable and interesting companion in the field, but a somewhat sticky and at times even difficult colleague in matters which had an administrative element. Looking back, however, what is much more striking is the degree of adaptability and self-abnegation which he demonstrated in schooling himself in middle age to the rather odd Oxford circus in which his lot was suddenly cast at the beginning of the 'thirties, and the fund of commonsense and wisdom which he brought to translating into reality a vivid dream of the future of British ornithology which might as easily have become a fiasco or a nightmare without the saving qualities of heart and mind which he contributed in putting it into practice. Certainly there could have been no more striking vindication of the conviction that the future advance of British ornithology lay in team work than that such a man as W.B.A. should have been content, and with so much success, to stake his future thirty-five years ago on that belief. All who share this conviction owe him a great debt.

E.M.N.



PLATE 22. Wilfrid Backhouse Alexander (1885-1965) (pages 125-128)





Notice to Contributors

British Birds publishes material dealing with original observations on the birds of Britain and western Europe or, where appropriate, on birds of this area as observed in other parts of their range. Except for records of rarities, papers and notes are normally accepted only on condition that the material is not being offered to any other journal. Photographs (glossy prints showing good contrast) and sketches are welcomed. Proofs of all contributions are sent to authors before publication.

After publication, 25 separates of papers are sent free to authors (two or more authors of one paper receive 15 copies each); additional copies, for which a charge is made, can be provided if ordered when the proofs are returned.

Papers should be typewritten with double spacing, and on one side of the sheet only. Shorter contributions, if not typed, must be clearly written and well spaced.

Notes should be worded as concisely as possible, and drawn up in the form in which they will be printed, with signature in block capitals and the writer's address clearly written on the same sheet. If more than one note is submitted, each should be on a separate sheet, with signature and address repeated.

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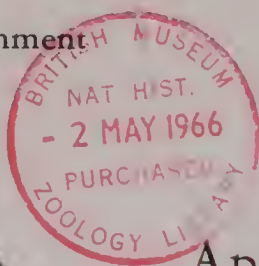
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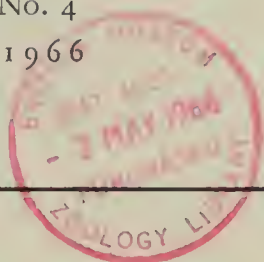
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British Birds

Vol. 59 No. 4
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Passerine night migrants on Skokholm

By David and Peter Lack

INTRODUCTION

THE FIRST British bird observatory was founded in 1933, when R. M. Lockley made a small Heligoland-type trap in his garden on Skokholm, Pembrokeshire (Lockley and Russell 1953); a big Heligoland trap was built some two hundred yards from it two years later (Lockley 1947). These two traps still catch most of the passerine migrants that are ringed on Skokholm. The object of this paper is to analyse the passage through the island of chats, warblers and flycatchers, i.e. all species in the family Turdidae, except the Wheatear *Oenanthe oenanthe*, as this is a common breeding bird, and the true thrushes *Turdus spp.*, which pass through under rather different conditions from the rest. The present analysis should be compared with that for the same species at the British east coast observatories from Fair Isle, Shetland, down to Cley, Norfolk (Lack 1960ab); there, however, the totals were based on numbers observed, whereas in the present paper the numbers trapped and ringed have been used, as these are thought to provide a more reliable indication of arrivals on Skokholm. Later in this paper, the term 'British east coast observatories' means those from Fair Isle to Cley and not the ones further south, such as Dungeness.

Skokholm, about 260 acres in extent, lies two miles west of the mainland of Pembrokeshire and two miles south of the larger island of Skomer, so is less isolated than any other island observatory in Britain. There are a few trees in the garden trap and a few bushes in the Heligoland trap, but otherwise the vegetation consists of open moorland, though in many areas thick bracken provides good cover for migrants in autumn, so that many escape being trapped. From 1947

onward, the two traps have been worked regularly throughout the periods when the observatory has been open between late March and early October in every year, but starting in early March and ending in late October in some years. Visitors have been more energetic in trapping birds in some weeks and some years than in others, but the weekly variations are smoothed out over a long period of years, while the annual variations, though important, have had a much smaller influence on numbers caught than the weather and other natural

Table 1. Numbers of commoner night migrants ringed on Skokholm, Pembrokeshire during 1947-65

The mean number per year is based on the years 1948-65. It should also be noted that the earliest spring migrants and the latest autumn migrants were not trapped in all years

	Mean number per year		Number in best year		Largest number in one day		Mean date of passage	
	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn
Stonechat								
<i>Saxicola torquata</i>	3	8	23	39	4	13	3 Apr	2 Oct
Whinchat								
<i>Saxicola rubetra</i>	4	5	10	14	4	5	1 May	9 Sep
Redstart								
<i>Phoenicurus phoenicurus</i>	5	4	19	9	5	5	4 May	18 Sep
Black Redstart								
<i>Phoenicurus ochruros</i>	1.8	0.8	10	6	5	2	1 Apr	19 Oct
Robin								
<i>Eritacus rubecula</i>	5	20	28	42	7	4	5 Apr	10 Sep
Grasshopper Warbler								
<i>Locustella naevia</i>	10	0.7	44	2	16	1	29 Apr	7 Sep
Sedge Warbler								
<i>Acrocephalus schoenobaenus</i>	50	10	98	34	19	9	6 May	16 Aug
Melodious Warbler								
<i>Hippolais polyglotta</i>	0.2	1.2	1	6	1	2	—	1 Sep
Blackcap								
<i>Sylvia atricapilla</i>	2.4	0.6	6	3	2	1	3 May	5 Oct
Garden Warbler								
<i>Sylvia borin</i>	2.1	1.5	7	5	2	2	15 May	14 Sep
Whitethroat								
<i>Sylvia communis</i>	160	34	431	62	105	60	12 May	28 Aug
Willow Warbler								
<i>Phylloscopus trochilus</i>	172	180	290	547	53	253	23 Apr	11 Aug
Chiffchaff								
<i>Phylloscopus collybita</i>	46	26	105	102	20	24	16 Apr	17 Sep
Goldcrest								
<i>Regulus regulus</i>	2.3	7	10	35	4	8	4 Apr	28 Sep
Spotted Flycatcher								
<i>Muscicapa striata</i>	26	20	58	56	15	20	21 May	26 Aug
Pied Flycatcher								
<i>Ficedula hypoleuca</i>	0.4	8	1	19	1	8	(6 May)	6 Sep

PASSERINE MIGRANTS ON SKOKHOLM

Table 2. Numbers of rarer night migrants ringed on Skokholm, Pembrokeshire, during 1947-65

	Spring	Autumn
Nightingale <i>Luscinia megarhynchos</i>	1	1
Bluethroat <i>Luscinia svecica</i>	0	3
Reed Warbler <i>Acrocephalus scirpaceus</i>	3	1
Aquatic Warbler <i>Acrocephalus paludicola</i>	0	2
Waterline Warbler <i>Hippolais icterina</i>	0	3
Olivaceous Warbler <i>Hippolais pallida</i>	1	0
Barred Warbler <i>Sylvia nisoria</i>	0	2
Lesser Whitethroat <i>Sylvia curruca</i>	8	6
Subalpine Warbler <i>Sylvia cantillans</i>	0	1
Greenish Warbler <i>Phylloscopus trochiloides</i>	0	2
Wood Warbler <i>Phylloscopus sibilatrix</i>	0	3
Donelli's Warbler <i>Phylloscopus bonelli</i>	0	1
Yellow-browed Warbler <i>Phylloscopus inornatus</i>	0	1
Treecrest <i>Regulus ignicapillus</i>	3	1
Red-breasted Flycatcher <i>Ficedula parva</i>	0	6
Totals	16	33

ectors. Hence the figures used in this paper have been averaged for all the available post-war years combined except that, as many fewer birds were caught in 1947 than any later year, the results for that year have been excluded from the annual averages. It should also be remembered that the numbers trapped in early March and late October are misleadingly low because the island was not manned at these seasons in all years.

The numbers of the regular migrants ringed are set out in table 1 and those of the rarities in table 2, together with their scientific names, while in tables 3 and 4 are shown the main periods of passage of each regular species which has occurred in sufficient numbers for averages to be meaningful. Nearly all the species concerned are purely passage migrants through Skokholm, but the Whitethroat bred in 1965 and Robins regularly spend the winter, as have Stonechats and Black Redstarts in some years. Recoveries of these ringed birds away from Skokholm have been extremely few (Harris 1964), so that one cannot be sure where most of them breed, but the great majority almost certainly do so in Britain, though a few evidently come from the Continent.

We are extremely grateful to Skokholm Bird Observatory for the loan of trapping records, to the large number of observers who have helped to trap birds there, and to C. M. Britton, Dr. P. R. Evans, R. E. Breau, J. L. F. Parslow and Dr. C. M. Perrins for criticisms of this paper.

This section summarises the status of each of the passerine night migrants on Skokholm.

Stonechat. Regular in small numbers from 1956 until 1962, rare in other years, presumably because of the heavy reduction in its numbers after the hard winters of 1946/47 and 1962/63 respectively. In spring most have been trapped in early March, but it is not certain whether these have spent the winter on the island or whether this is the time of the main spring passage. Others have been caught at the end of March and a few up to mid-April. There have been sporadic occurrences in May, June and July, possibly from the adjoining mainland, while the main autumn arrivals have been between late September and mid-October.

Whinchat. Surprisingly uncommon, bearing in mind that it breeds in Wales. This species is much commoner in autumn at the British east coast observatories, where most of the passage is presumably from Scandinavia. On Skokholm, the main spring passage is from 21st April to 10th May and the main autumn passage is in the first three weeks of September.

Redstart. Like the Whinchat, surprisingly uncommon on Skokholm, seeing that it breeds regularly in Wales. Like the Whinchat also, it is far commoner in autumn at the British east coast observatories, where most of the passage is presumably from Scandinavia. On Skokholm, both passages are more extended than in the Whinchat, that in spring at about the same time, while that in autumn, which perhaps includes Scandinavian birds, has its peak about a fortnight later.

Black Redstart. A sparse migrant, much commoner in some years than others, and occasionally spending the winter. The main spring passage is in the second half of March and the first week of April, but with occasional individuals in late April, May and June. The autumn passage is primarily in the second half of October, when the observatory has been manned in only some years, so the numbers recorded are an underestimate.

Robin. A regular migrant, commoner in autumn than spring, but never recorded in big falls such as occur in some autumns at the British east coast observatories, presumably of Continental birds. Even so, it is the fourth commonest species on Skokholm in autumn. The main spring passage is in the second half of March, with occasional individuals up to the end of May and once in late June, while the autumn passage is very extended, but mainly in September. Some spend the winter.

Grasshopper Warbler. Much commoner in spring than at any of the British east coast observatories, and far commoner in spring than autumn. The peak of the spring passage is in the first week of May.

Sedge Warbler. On Skokholm the third commonest species in spring and the sixth commonest in autumn, being much commoner in spring (though not in autumn) than at the British east coast observatories. The main passage is between late April and mid-May and between late July and mid-August.

Melodious Warbler. Rare in spring, but almost regular in autumn from 1955 onward, and especially from 1958, chiefly between mid-August and mid-September; far commoner than at the British east coast observatories.

Blackcap. Scarce but regular in spring, chiefly between mid-April and mid-May; very scarce indeed in autumn, when most have occurred in October, including the last week of the month when the observatory has been manned in only a few years, so that the numbers recorded are an underestimate. This species is less common in autumn on Skokholm than at the British east coast observatories, presumably because the latter receive Scandinavian birds, but it is not numerous even in the east.

Garden Warbler. Compared with the Blackcap, the Garden Warbler occurs in spring in similar numbers but rather later, and in autumn in rather greater numbers but rather earlier. This species is much commoner in autumn at the British east coast observatories, presumably owing to the passage of Scandinavian birds.

Whitethroat. The second commonest species at both seasons, in spring being almost as common as the Willow Warbler, but in autumn much less so. In spring, it is commoner on Skokholm than at the British east coast observatories. The main passage is in the first three weeks of May and between mid-August and mid-September, but there are sporadic records in June and July.

This is the only species of which over 60 individuals have been ringed on one day in spring, the largest number being 105 on 22nd May 1959.

Willow Warbler. The commonest migrant on Skokholm, occurring in similar numbers in spring and autumn, in contrast to the British east coast observatories where it is at least twice as common in autumn as spring. The main passage on Skokholm is between mid-April and the first week of May and from the last week of July to the third week of August. As shown elsewhere (Lack 1963), small bird echoes moving SSE at night become common on English radar displays in the last week of July, and the present Skokholm records indicate that these probably come chiefly from Willow Warblers with some Sedge Warblers. The Willow Warbler is the only species of which over 60 individuals have been ringed on one day in autumn, the largest totals being 253 on 8th August 1948, 215 on 21st August 1958 and 189 on 4th August 1963, these three days between them including one-fifth of all those ringed on Skokholm in autumn; the next largest figure was only 91.

Chiffchaff. Nearly twice as common in spring as in autumn, in spring being the fourth commonest and in autumn the third commonest species on Skokholm. At both seasons, especially the spring, it is commoner than at the British east coast observatories. The main passage is between late March and the end of the third week of April and from the second week of September to the end of the month.

Goldcrest. Very sparse in spring, chiefly from the third week in March to the third week in April, but regular in small numbers in autumn, chiefly from late September to mid-October. This species is much commoner in autumn at the British east coast observatories, where the occasional big falls in early October have had no counterpart on Skokholm, presumably because Scandinavian birds are involved.

Spotted Flycatcher. The fifth commonest species on Skokholm in both spring and autumn, and slightly more numerous at the former than the latter season. It is commoner at both seasons than at the British east coast observatories. The main passage is from the second week of May to the end of the month and from the second week of August to early September.

Pied Flycatcher. Far commoner in autumn than spring, as at other observatories, but far scarcer in autumn on Skokholm than at the British east coast observatories. This is presumably because there is a big passage of Scandinavian birds through the east coast of Britain. One may suspect that Scandinavian birds also form the bulk of those trapped on Skokholm in autumn, as they occur at the same period, mainly between late August and the end of the third week of September.

The rarities. The 15 species which have been trapped on Skokholm on an average of less than once each spring or autumn are listed in table 2. (We did not seek to check the identifications involved.) Nine of them occurred solely in autumn, as is usual at other observatories, presumably because most birds that are badly off-course are juveniles. But more Lesser Whitethroats and Reed Warblers have occurred on Skokholm in spring than autumn. Seven of these species are regular, or almost regular, at other observatories, particularly Fair Isle, including the Bluethroat, Icterine Warbler, Barred Warbler, Lesser Whitethroat, Yellow-

BRITISH BIRDS

browed Warbler and Red-breasted Flycatcher, while the Firecrest is regular at Dungeness and elsewhere. The comparative scarcity of these species on Skokholm is doubtless due partly to its lying so far west of the usual route of such Continental migrants as the Bluethroat, Icterine Warbler and Firecrest. But rarities are also much scarcer on Skokholm than at observatories further west in the British Isles, notably St. Agnes in Scilly and Great Saltee in Ireland, and also on Lundy some 45 miles south-east of Skokholm. This may be because Skokholm, with other land only two miles to both the east and the north, is far less isolated than these other observatories, so that it draws its lost birds from a much smaller area of sea.

DISCUSSION

The times of the main spring and autumn passage of each species, sum-

Table 3. Percentages of the commoner night migrants ringed on Skokholm, Pembrokeshire, in each five-day period in spring during 1947-65

The scientific names of these species are given in table 1. x indicates less than 0.5% where total ringed was large, and one bird where the total ringed was less than 60

	Stonechat	Whinchat	Redstart	Black Redstart	Robin	Grasshopper Warbler	Sedge Warbler	Blackcap	Garden Warbler	Whitethroat	Willow Warbler	Chiffchaff	Goldcrest
Before 12th March	40				4							x	x
Mar 12th-16th	7			4	2							1	12
17th-21st	4			21	7							1	
22nd-26th	2			10	13						x	4	17
27th-31st	16			41	31						1	10	10
Apr 1st-5th	5			7	6			x			4	9	x
6th-10th	7	1	2	10	8	2	x	x		x	9	14	17
11th-15th	4	3	5	4	4	3	1	x		x	12	11	12
16th-20th	4	8	11		4	6	2	14		1	14	14	17
21st-25th		21	9		2	18	7	12		4	15	12	7
26th-30th		18	9	4	5	16	20	14	8	5	13	7	x
May 1st-5th		19	24		5	42	20	12	5	18	17	6	
6th-10th		14	10		2	10	19	14	13	17	7	4	
11th-15th		9	12		2	2	18	9	21	20	4	2	x
16th-20th	x	5	6		0	2	9	7	21	14	1	2	
21st-25th		3	5	x	2	1	4	7	16	14	1	1	
26th-30th	x		3		1		1		13	5	x	1	
31st-4th	x		4				x	x	x	1	x	x	
Jun 5th-9th								x		x	x	x	
10th-14th				x						x	x	x	
15th-19th	4									x	x	x	
20th-24th	x				1					x	x		
25th-30th				x						x	x	x	
Totals ringed	55	78	93	33	98	187	905	43	38	2912	3183	850	42

PASSERINE MIGRANTS ON SKOKHOLM

marised in tables 3 and 4, confirm what was already known approximately about the migration periods of the British resident species in question. But it is valuable to have quantitative measurements throughout the migration periods, to supplement the dates of first and last appearance each year that formerly constituted our knowledge of the movements of these species in Britain. An unexpected point is that some passage, though on a small scale, occurs throughout the summer, particularly in the cases of the Whitethroat, Willow Warbler, Chiffchaff and Spotted Flycatcher. Even a Black Redstart has turned

Table 4. Percentages of the commoner night migrants ringed on Skokholm, Pembrokeshire, in each five-day period in autumn during 1947-65
The scientific names of these species are given in table 1. x is used as in table 3

	Stonechat	Whinchat	Redstart	Black Redstart	Robin	Sedge Warbler	Melodious Warbler	Garden Warbler	Whitethroat	Willow Warbler	Chiffchaff	Goldcrest	Spotted Flycatcher	Pied Flycatcher
10th July	1				x				x	x			1	
10th-14th	1								1	x				
15th-19th	2					1			1	1				
20th-24th	1				x	1			1	3			1	
25th-29th	1				x	10			2	7			1	
30th- 3rd					1	19	5		2	20			2	
4th- 8th	1		1			16			4	25			5	
9th-13th		3	1		3	10	5		7	10			13	2
14th-18th		7	6		4	7	14		6	8	x		12	3
19th-23rd		6	3		7	5	10	4	9	11	x		11	11
24th-28th	1	3	4		9	6	10	11	8	4	2		12	6
29th- 2nd		8	3		12	4	14	7	19	3	2	7	10	13
3rd- 7th	1	15	7		12	9		4	6	3	7	4	9	15
8th-12th	3	22	7		9	5	19	19	17	4	23	3	8	20
13th-17th	3	11	6		10	3	14	15	8	1	13	6	6	9
18th-22nd	14	13	22		10	2	5	15	4	1	24	9	4	13
23rd-27th	12	2	10		11	1		11	3	x	11	7	5	4
28th- 2nd	13	5	8		6			7	x	x	9	29		2
3rd- 7th	7	2	10		2		5				5	8	x	1
8th-12th	21		6	7	3	1		7			2	13	x	
13th-17th	9	1	4	43	2	1					1	10		
18th-22nd	3	1	1	21	1						x	3		
23rd-27th	3			14							x	1		
28th- 2nd	3			14	x				(x)					
aged	152	87	72	14	359	186	21	27	610	3318	460	134	357	148

up in late June, and so has a Redstart, though it escaped ringing. The first big autumn movements occur in the last ten days of July, confirming what was earlier recorded over England by radar (Lack 1963).

At the British east coast observatories, most of the species considered in this paper occur much more often in autumn than spring (Lack 1960ab) and, though the birds in question are at least twice as numerous in autumn because of the intervening breeding season, most of them are much more than twice as numerous on autumn passage. On Skokholm, on the other hand, most of these species have been commoner in spring than autumn, the Grasshopper Warbler 14 times as common, the Sedge Warbler, Blackcap and Whitethroat between four and five times as common, and the Redstart, Black Redstart, Garden Warbler, Chiffchaff and Spotted Flycatcher a little commoner. The Whinchat and Willow Warbler have been slightly more numerous in autumn than spring (though if three big falls of Willow Warblers had been excluded, the situation in this species would have been reversed), but in both species, allowing for the increase due to breeding, the percentage of the migrant population that occurred on Skokholm was higher in spring than autumn. In contrast to these ten species, five others were decidedly commoner in autumn than spring, the Stonechat, Robin and Goldcrest about three times as common, the Melodious Warbler seven times as common and the Pied Flycatcher 18 times as common.

Many visitors to Skokholm have noticed that in clear weather, whether calm or windy, hardly any migrants occur, but even a tiny shower or a little mist around dawn may produce a small number. The conditions under which the big arrivals have occurred confirm this impression. From 1947 to 1965 inclusive, there were 16 days in spring when at least 50 individuals of the species discussed in this paper were ringed. The dates were as follows (occasions with 100 or more birds being specified): 2nd May 1949, 5th May 1952, 13th May 1954, 3rd May 1957 (100), 2nd May 1958, 5th May 1958, 10th May 1958, 4th April 1959, 8th May 1959, 22nd May 1959 (129), 2nd May 1960 (102), 9th May 1960, 12th May 1960, 7th April 1961, 29th April 1961 and 14th May 1962. To these may be added 8th May 1963, when there were 49 individuals of ten species. There were likewise nine days in autumn when at least 50 migrants of these species were ringed (occasions with 100 or more again being specified): 31st July 1948, 8th August 1948 (268), 31st August 1955, 21st August 1958 (236), 13th August 1959, 31st July 1963, 1st August 1963, 4th August 1963 (194) and 14th August 1964. On 3rd September 1961 there were 40 individuals of eight species.

Inspection of the British Daily Weather Reports for these 27 'big days' shows that the wind might be blowing from any quarter and

might be strong, weak or virtually absent, so that it clearly had no important influence. The same applied to the temperature, and also to the general weather situation, for though on most days the weather was disturbed, on several in both spring and autumn it was anticyclonic. In contrast, there was a close correlation with the visibility, which was extremely bad on all the days concerned. On eleven of the 17 'big days' in spring, the weather map showed a warm, cold or occluded front over Skokholm itself in the early morning, with accompanying rain or full overcast; on three others rain or full overcast was recorded at Aberporth, the nearest weather station to Skokholm; on two more there was widespread fog or mist in this part of Britain; and on the last one the sky above Aberporth was seven-eighths obscured. Similarly, on three of the ten 'big days' in autumn there was a cold, warm or occluded front over or close to Skokholm in the early morning; on one there was rain and on another full overcast at Aberporth; on four more there was widespread fog; and on the last one the sky above Aberporth was seven-eighths obscured. While detailed records were in most cases not available for Skokholm itself, the weather there must always have been very similar to that at Aberporth. It may be added that when a big fall occurred in anticyclonic weather, there was normally fog at Skokholm.

Clearly, passerine night migrants occur on Skokholm primarily when forced down by bad visibility, as pointed out earlier for the Irish Sea area in general by Williamson (1958, 1960). Hence the records for the 'big days' throw no important light on the conditions in which migrants set out. Similarly, the most important meteorological factor producing what used to be called 'drift-migration' on the English east coast is bad weather at the coast causing birds to alight, though full overcast has not been the sole important factor there, perhaps because the migrants have already had a long sea crossing (Lack 1960a, Lack and Parslow 1962).

In autumn, there is much thick bracken on Skokholm, so that there is far more cover than in spring outside the traps, and it is therefore possible that a smaller proportion of the migrants landing on Skokholm are trapped in autumn than spring. This may be one reason why more migrants are caught in spring, but it can hardly be the main reason, nor, of course, will it explain why a few species are caught more often in autumn than spring.

The main reason is probably related to the distance which the migrants have travelled before they pass over Skokholm. Species that are summer residents in Britain are likely to have flown only a short way in autumn but a long way in spring before passing Skokholm. Hence if, as radar studies have shown, passerine night migrants set out primarily in clear weather, they have a much greater chance of meeting

bad visibility over Skokholm in spring than autumn. In addition, because in spring these birds have come much further, they will tend to be more tired and to have more depleted fat reserves than those passing in autumn, and so may be more readily forced down by unfavourable weather. These conditions will, of course, hold in the opposite sense for any species passing over Skokholm that are primarily winter visitors to southern Britain.

These general considerations help to explain many of the differences between the size of the spring and autumn passages on Skokholm, and many of the differences in autumn between Skokholm and the British east coast observatories. The Whinchat, the Redstart, all the British breeding warblers and the Spotted Flycatcher are British summer visitors, so it should follow from what has just been said that they are more likely to be forced down on Skokholm in spring than autumn; in fact, most of them are commoner there in spring than autumn, while the rest are about equally common at the two seasons although the birds must be more numerous in autumn. In contrast, many of these same species are much commoner in autumn than spring at the British east coast observatories, but here most of the autumn passage is of Scandinavian migrants which have already flown a long distance over the North Sea before reaching the British east coast. Norfolk is on a direct line SSW from Scandinavia to Iberia, whereas Skokholm is well to the west, so Skokholm is far less likely than Norfolk to receive Scandinavian passerine migrants, though some occur, as discussed later. This is presumably why such birds as the Whinchat, Redstart and Garden Warbler, among others, are much commoner in autumn at the British east coast observatories than on Skokholm, and the same applies to a lesser extent to other species. Finally a few species that pass through Skokholm may be winter visitors to southern Britain, which is perhaps why the Goldcrest is commoner there in autumn than spring, and the same could apply to the Stonechat and Robin.

These general considerations affect all the species, but it is clear from the marked differences between them that different species are affected to a different degree. For instance, the great rarity of the Grasshopper Warbler in autumn presumably means either that this species sets out in autumn only when conditions are particularly unlikely to produce bad visibility later in the night, or that it is much less affected than any other small night migrant if bad conditions are encountered near the start of its journey. That it is brought down on migration far less often than other warblers is confirmed by its remarkable scarcity on both migrations across the Sahara (Moreau 1961). Another possible explanation for its scarcity on Skokholm in autumn, that it takes a different route from the spring, seems highly unlikely, especially as it is much com-

moner in spring than autumn at all the British bird observatories, wherever they are situated. Presumably the Sedge Warbler, Blackcap and Whitethroat, which likewise are much commoner in spring than autumn, also select very favourable weather for starting or are very unlikely to be forced down near the start, though they are less extreme in these respects than the Grasshopper Warbler. On the other hand, as the Willow Warbler is about as numerous in autumn as in spring, it is presumably less selective for good weather in starting, or more readily forced down soon after starting, than these other species. It should be added that the dates of the Willow Warbler's passage through Skokholm in autumn, with a peak in the first week of August, show that the vast majority are British summer residents. Also, nearly all are juveniles, which are probably forced down more readily than adults.

The Whinchat, Redstart and Garden Warbler are proportionately rather more common on Skokholm in the autumn compared with the spring than are the Sedge Warbler, Blackcap and Whitethroat, conceivably because the three former species are less selective in the weather in which they set out. But much more probably this difference arises because the autumn passage of Whinchats, Redstarts and Garden Warblers through Skokholm is supplemented by birds from Scandinavia. As already mentioned, these three species are regular in the falls of Scandinavian night migrants at the British east coast observatories in autumn, and the western fringe of this movement perhaps reaches Skokholm on some occasions. Fitting with this view, the dates on which many of them appear on Skokholm, particularly the Redstarts, are later than might be expected if they were British summer visitors, but are similar to those of the Scandinavian arrivals on the British east coast. The Chiffchaff and Spotted Flycatcher, like the Redstart and Garden Warbler, are only a little commoner in spring than autumn on Skokholm, and the explanation might be the same, that a proportion of the migrants on Skokholm in autumn have come from Scandinavia. But the dates of the autumn passage on Skokholm do not particularly suggest this, so it seems at least as likely that the Chiffchaff and Spotted Flycatcher resemble the Willow Warbler in being either less selective for good weather when setting out, or more readily forced down near the start of their journey by bad conditions, than most of the other species.

Of the birds that are much commoner on Skokholm in autumn than spring, the Goldcrest, as already mentioned, is presumably a winter visitor to southern Britain and so has come further before passing over Skokholm in autumn than spring. While this may also apply to the Stonechat and Robin, it seems possible that these two species move only locally, without putting on migratory fat, so may be readier to alight on Skokholm in autumn than are the long-distance migrants

heading for Africa. The Pied Flycatcher is in a class by itself because, though it is a summer visitor to Wales, it is vastly commoner on Skokholm in autumn than in spring. The dates of its appearances in autumn on Skokholm coincide with those of Scandinavian migrants on the British east coast, and presumably most, if not all, of those on Skokholm have come from Scandinavia. That, on Skokholm as at all other British bird observatories, extremely few Pied Flycatchers occur in spring presumably means that at least the Continental populations of this species travel further to the east in spring than autumn.

The Melodious Warbler is also much commoner on Skokholm in autumn than spring. As this species does not breed in Britain, but solely on the Continent well to the east and south of England, it is surprising that it should be regular in autumn at Skokholm and other bird observatories in southern England, Wales and Ireland. Probably this is due to a reversed migration similar to that postulated by Nisbet (1962) to explain the equally remarkable regularity of the Barred Warbler and Red-breasted Flycatcher in autumn on the British east coast. The few Melodious Warblers that have occurred on Skokholm in spring have possibly 'overshot' their breeding areas with a following wind. As already mentioned, nearly all the rare migrants on Skokholm have occurred in autumn, partly, as suggested, because juveniles are much more likely than adults to stray far off-course, and partly, perhaps, through reversed migration.

Summing up, it is possible to suggest reasons for the differences in the occurrence of different species of migrants in spring and autumn on Skokholm, and for the differences between Skokholm and the British east coast observatories. But these suggestions are highly tentative, and what is needed now is a broad comparison of the occurrences of the species concerned in other parts of Britain and on the Continent, carried out in the same imaginative way that has enabled Moreau (1961) to draw such important conclusions concerning the trans-Saharan migrations of these and other species.

SUMMARY

An analysis of the small night migrants of the family Turdidae ringed on Skokholm, Pembrokeshire, enables the main periods of their spring and autumn passages to be assessed quantitatively, as in tables 3 and 4. The species concerned, with their scientific names and the numbers ringed, are listed in tables 1 and 2.

Most species are commoner in spring than autumn, probably because these are British summer residents which, when they pass over Skokholm, are much nearer the start of their migratory flight in autumn than spring. Hence the birds are less likely to meet adverse weather over Skokholm in autumn than spring and may also be less likely to be forced down if they meet it. But these considerations affect some species to a much greater extent than others, and they apply in a reverse sense to the winter visitors.

The position is complicated in a few species, notably the Pied Flycatcher, by the

MOULT MIGRATION OF SHELDUCKS

passage of Scandinavian populations through Skokholm in autumn, while the Melodious Warblers perhaps arrive in autumn on a reverse migration from the south-east.

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The moult migration of Shelducks from Bridgwater Bay

By J. V. Morley

The Nature Conservancy

PIERRETT (1953) established that Bridgwater Bay in Somerset is used as a moulting ground by Shelducks *Tadorna tadorna*. However, later studies by Eltringham and Boyd (1960, 1963) showed that only a small proportion of the July concentration of Shelducks remains to moult in the Bay, the majority flying on to the Continental moulting grounds after a short period. This paper is concerned with the departures of such passage birds from Bridgwater Bay, particularly with the routes followed and the numbers leaving in relation to weather conditions.

RESULTS

In 1963, preliminary observations were carried out on 42 evenings from 2nd June to the end of July. Up to 19th July they were made from

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Table 1. Departures of Shelduck *Tadorna tadorna* from Bridgwater Bay, Somerset, in July 1963 and 1964, with a summary of weather conditions

The flight numbers correspond to those shown on fig. 1. All times are GMT. The meteorological information was obtained from Bristol Airport, Lulsgate (620 feet), for 19.00 hours in all cases except those marked with an asterisk on the right which refer to 20.00 hours; cloud cover is given in eighths, visibility in nautical miles, wind direction by the number of degrees from true north, and wind speed in knots

Date	Flight number	Time	Number of birds	Cloud cover	Visibility	Wind direction	Wind speed
1963							
July 8th	1	20.25	43	}	Meteorological data not obtained		
July 16th	2	20.45	27				
July 18th	3	19.40	58				
July 21st	4	18.45	22				
July 22nd	5	20.00	80				
1964							
July 1st	1	20.30	105	1	16	300	8
		20.45	45				
July 2nd		No watch		1	22	340	10
July 3rd			Nil	6	22	320	3
July 4th		No watch		5	12	070	9
July 5th			Nil	5	22	340	6
July 6th	2	19.00	28	1	13	260	13
		19.24	17				
July 7th			Nil	8	14	230	15
July 8th		No watch		7	15	260	18
July 9th			Nil	6	16	260	20
July 10th	3	18.40	20	7	15	260	13
		19.00	25				
July 11th			Nil	8	8	250	15
July 12th	4	19.38	20	1	15	270	10
		19.45	23				
		19.55	42				
		20.16	28				
		20.41	30				
July 13th			Nil	7	15	180	14
July 14th			Nil	7	11	210	10
July 15th			Nil	5	16	290	7
July 16th	5	19.15	10	1	5	320	5
July 17th			Nil	4	2.5	320	6*
July 18th	6A	19.11	50	3	16	260	6*
	6B	20.15	22				
July 19th		No watch		7	9	290	12
July 20th			Nil	5	5	300	6
July 21st			Nil	7	3	010	7
July 22nd			Nil	4	5	300	5
July 23rd			Nil	6	3	300	8
July 24th	7A	19.34	47	2	8	270	10
	7B	20.08	23				
July 25th	8	19.45	15	6	12	300	8
July 26th		No watch		5	14	260	8
July 27th	9	20.05	45	4	15	260	13*

Stert Point or the Huntspill Wall and after that from a high sand-dune near Berrow Church (see fig. 1). During the first 27 of these watches only three flights were observed (1, 2 and 3 in the first section of table 1). All took place from the northern part of the Bay and no Shelducks were seen to leave the southern part. It was for this reason that the watches were switched on 19th July to the more northerly observation point near Berrow Church. From there two flights were noted (4 and 5 in the first section of table 1) and their directions confirmed as north-easterly.

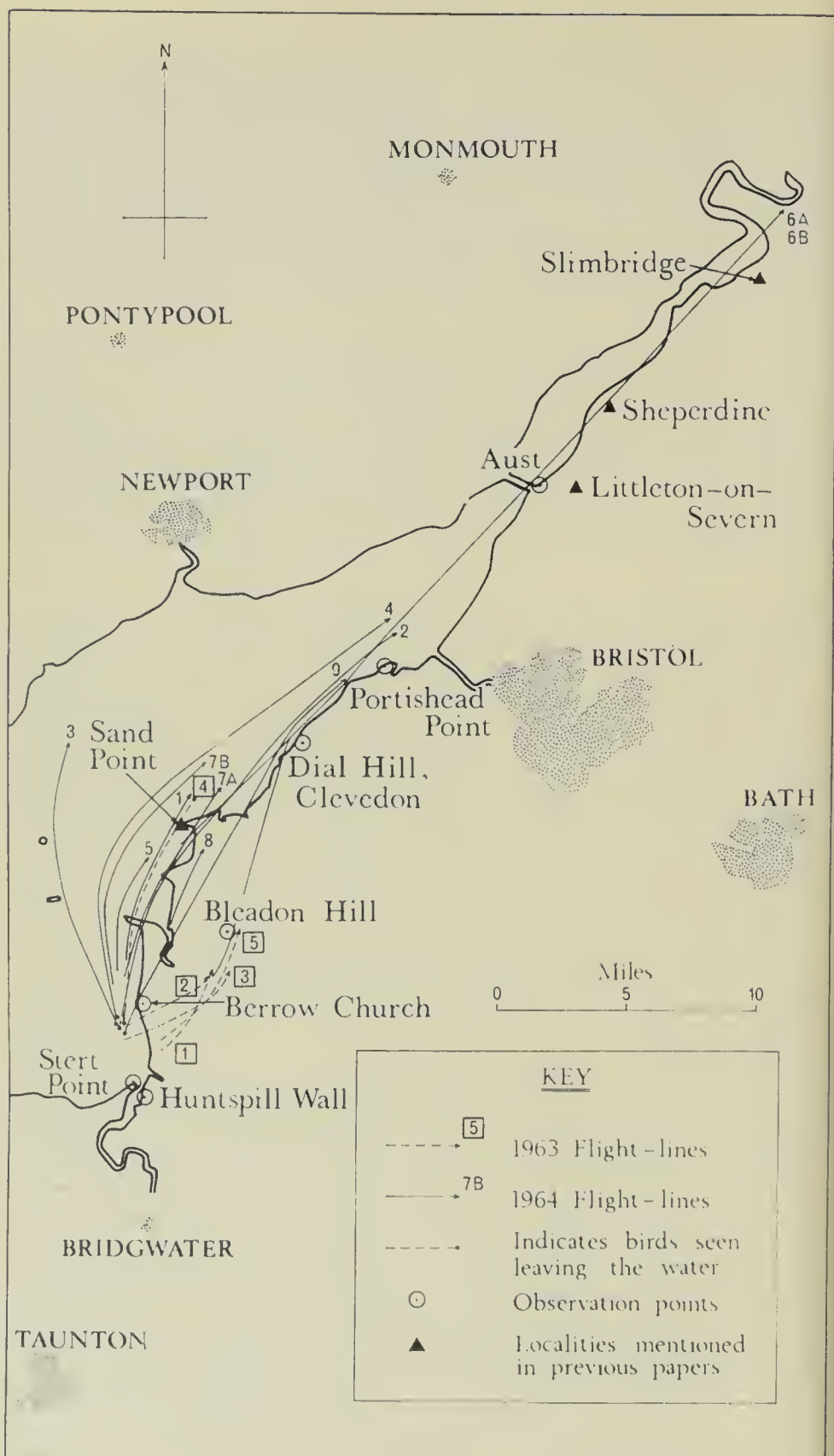
In 1964, watches were kept on 22 evenings between 1st and 27th July. Each extended from 18.00 hours GMT until dusk and they were made from one or more of the following places: Bleadon Hill (470 feet), Dial Hill (300 feet), Portishead Point (50 feet) and Aust (100 feet) (see fig. 1). From these points further north than any of those used in 1963, eleven departures involving a total of 595 Shelducks were recorded. Details are given in the main section of table 1.

BEHAVIOUR

Pre-departure aerial evolutions were performed by most of the flocks which took the inland route via Bleadon Hill. After rising from the sea opposite Berrow Church they flew in close formation and circled upwards to about 1,000 feet. On approaching the vicinity of Brent Knoll (not shown on fig. 1, but three miles ESE of Berrow Church) they usually turned and headed back to sea, dividing into several groups. Once over the shoreline most of them regrouped and, circling upwards, turned inland again before setting off on their journey from the Bay. On a few occasions a small number of individuals left a flock and resettled on the sea.

These evolutions might be undertaken once or several times. On one occasion they were repeated five times before the flock finally left the area. They were not performed by any of the flocks that took the seaward route.

Owing to the topography of the ground over which the Shelducks passed, it was possible to obtain a reasonable assessment of their altitude. From the point of take-off they rose quickly to about 500 feet in the Berrow-Brent Knoll area. This height was maintained if the inland route via Bleadon Hill was taken, the flocks passing low over the hill (470 feet). When the shore route was taken, however, they continued to gain height and passed over the area of Brean Down and Weston super Mare (the headlands west of Bleadon Hill) at about 750 feet. For the flight up Channel from the Woodspring Bay-Clevedon area north-eastwards, irrespective of the route taken to this area from the point of departure, the flocks appeared to maintain a level flight at about 1,000 feet. Apparently not all flocks fly up-channel at this



N

MONMOUTH

PONTYPOOL

Slimbridge

6A
6B

Sheperdine

Aust

▲ Littleton-on-Severn

NEWPORT

BRISTOL

BATH

Portishead Point

Dial Hill, Clevedon

Sand Point

Bleadon Hill

Berrow Church

Miles

0 5 10

Stert Point

Huntspill Wall

BRIDGWATER

TAUNTON

height, however, as T. B. Silcocks (*in litt.*) has recorded several at Sand Point flying at about 200 feet.

Calculations of speed of flight were made by timing the birds between known points and in seven instances these averaged 60 miles per hour (57-61 m.p.h.). On one occasion, 27th July, a flight was timed between Berrow Church and Dial Hill, a distance of 14 miles by the shortest route, which the flock covered in ten minutes, i.e. at a speed of 84 miles per hour.

DISCUSSION

The departures of Shelduck from Britain on their moult migration have been studied at Morecambe Bay (Coombes 1950), from the estuary of the River Mersey (Allen and Rutter 1956) and from the Solway Firth (E. Blezard and M. Philipson *in litt.*). In all these cases it was found that the majority of the Shelducks migrated in July and that their departure appeared to be conditioned by the prevailing weather, migration taking place on fine evenings with little or no cloud combined with fair to good visibility and a following wind. This last factor was essential and an adverse wind stopped all activity. Very little movement was observed in dull cloudy weather.

The observations at Bridgwater Bay were in accord with these previous studies and confirmed that the behaviour of the Shelducks is affected by the amount of cloud and the degree of visibility. Twelve out of the 18 flocks departed when the cloud cover was four-eighths or less and visibility was over twelve miles. On two watches no departures were seen when the cloud cover was only four-eighths, but on both these occasions visibility was down to less than five miles. It is perhaps of note, however, that in conditions of good visibility (i.e. over 15 miles) but overcast (i.e. cloud cover greater than five-eighths) no Shelducks were recorded leaving the area. This suggests that the absence of cloud is the more important factor, with visibility only becoming significant if it is greatly reduced. Throughout the period of observation there was only one occasion when the wind was adverse, but, as this coincided with seven-eighths cloud and three miles visibility when movement would not, in any case, be expected, it was impossible to check the importance of wind direction.

FIG. 1 (*opposite*). Bridgwater Bay and the Severn Estuary to show the routes followed by the migrating Shelducks *Tadorna tadorna* recorded in this paper. The numbers of the flight-lines correspond to those used in table 1 (as shown in the key, the 1963 routes have broken lines and boxed numbers, while the 1964 ones have solid lines and open numbers). The 'localities mentioned in previous papers' are also referred to in the text, where the observation points are quoted with heights above sea-level

Observations of Shelducks migrating from Cheshire were also carried out during July 1964 (R. H. Allen *in litt.*). Flocks were seen departing on six dates, but only one of these (27th July) coincided with a departure date from Bridgwater. This suggests that local rather than general weather conditions determine departure.

Coombes (1950) and Allen and Rutter (1956) also described pre-flight evolutions similar to those recorded at Bridgwater Bay. Flocks leaving the vicinity of Slimbridge, Gloucestershire, have likewise been observed performing these evolutions (Hugh Boyd *in litt.*).

Allen and Rutter gave the speed of one flock of Shelduck as 50 miles per hour over a distance of five miles. This is less than recorded in the present work, but all these records are of ground speeds discounting the effect of wind which could result in differences of this order.

Eltringham and Boyd (1960, 1963) suggested that the Shelducks from the Bristol Channel undertook the typical migration flight to the German moulting grounds, flying in a north-easterly direction to the Heligoland Bight via the Wash. Such a suggestion is supported by the observation of Simms (1952) who recorded 30 Shelducks flying in an easterly direction over Stratford-upon-Avon, Warwickshire, in the late evening of 12th July 1950; this is almost on a direct line between the River Severn and the Wash. Further support is provided by Taylor (1958) who recorded two flocks of 17 and 44 on the evening of 14th July 1958 flying up river past Sheperdine, and one of 61 on 16th July that year seen from Littleton-on-Severn (see fig. 1). T. B. Silcocks (*in litt.*) has given me records of 13 flocks which he saw from Sand Point between 1953 and 1960, all going in a north-easterly direction; most of these flocks were watched until they went out of sight off Clevedon.

All these observations are in accord with the records obtained during the present study. Information is still required, however, to confirm the route taken further up the river in the vicinity of Slimbridge. L. P. Alder (*in litt.*) made 28 evening observations in July 1964 from the Dumbles, Slimbridge, but on only one occasion did he see any Shelducks; these were two flocks (totalling 55) which came in high from the south-west between 19.00 and 20.00 hours on the 6th.

ACKNOWLEDGEMENTS

I am grateful to I. Prestt for most useful criticism and suggestions in the preparation of this paper, and for valuable help in the field given by my wife, R. S. Cook and L. N. Earl. I should also like to thank the several observers named in the text, who allowed me to refer to their unpublished records. The meteorological observations are published by permission of the Director-General of the Meteorological Office (Copyright, Controller, Her Majesty's Stationery Office).



PLATE 23. Black Stork *Ciconia nigra*, Poland, June 1956. Bill-clappering is far rarer than in the White Stork *C. ciconia* and the head is not thrown back (cf. plate 16). Nests are in trees or on rock ledges; the bills of the nestlings are yellow, while those of young White Storks are black (pages 147-150) (photo: W. Puchalski).

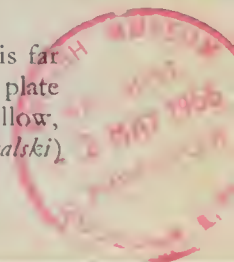




PLATE 24. Above, Black Stork *Ciconia nigra* with nestlings, Poland, June 1956; three to five eggs are laid and nesting success may be as high as 80% (page 149). Below, fully fledged juvenile stretching out wing and leg (photos: W. Puchalski)



PLATE 25. Juvenile Black Stork *Ciconia nigra*, Poland. Buff tips to the breast feathers show immaturity; head, neck and upper breast are brown, not black, while the upper-parts are brown-black with less gloss than in the adult. Bill and legs are greenish at this stage, then turn to red in the spring (photo: W. Puchalski)

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PLATE 26. White Storks *Ciconia ciconia*, Spain, May 1956, showing the throwing back of the head which accompanies bill-clapping; this display is regular as a greeting ceremony at the nest and at other times of excitement. The Black Stork *C. nigra* bill-clappers rarely, but is more vocal (page 149) (photo: Eric Hosking)

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Studies of less familiar birds

139. Black Stork

Photographs by W. Puchalski

(Plates 23-25 and 26)

FOR MANY YEARS NOW both European storks have been declining. The White Stork *Ciconia ciconia*, though protected by strong sentiment in many countries and often nesting close to man on houses, churches and ruins (plate 26), has suffered a marked decrease in western Europe throughout this century; the Black Stork *C. nigra*, more wary of human beings, a solitary nester and never so numerous, has withdrawn even further to the east in Europe, though in Asia it has a much more extensive and continuous distribution. Slightly smaller than its better-known relative, the Black Stork has a similar red bill and legs (duller in autumn and winter), but most of its plumage is black, handsomely glossed with green and purple, relieved by pure white on the breast, belly, under tail-coverts and axillaries (plates 24a and 25). It, too, lies with the neck fully extended, but, as befits a species nesting in woodland over many parts of its range, it is rather more agile and on migration is said to fly with faster wing-beats (Bannerman 1953-63). When it soars, which it does often and well, the red bill and outstretched legs make an attractive contrast with the distinctive black-and-white pattern of the plumage.

Once breeding over much of the Palearctic region to about 60° N, it disappeared from western and southern Germany about the middle of the last century (Voous 1960) and more recently from southern Sweden and Denmark, where the last nests were reported in 1953 and 1951

respectively. Except for an isolated pocket in western Spain and the adjoining areas of Portugal, where it appears to be scarce and local, with few recent records of nests, its range now begins in north Germany (where it is retreating and declining), Poland, Czechoslovakia, the eastern edge of Austria, Hungary, eastern Yugoslavia, Bulgaria and northern Greece. Eastwards, its breeding range stretches right across Siberia, penetrating well beyond 60° N further east and extending southwards to northern China and Korea, with a southern arm stretching west through Afghanistan and Iran to Georgia, Azerbaijan and Turkey. Less is known of any population changes in its often bare and mountainous haunts in Asia, but there are reports that it was exterminated in China and Korea in the recent wars (Austin 1962). It is a rare straggler to the British Isles and there have been only four or five authenticated records in the last 20 years; the most recent were in Worcestershire in May 1956, in Kent and Sussex in August-September 1958 and in Northumberland in May 1959 (*Brit. Birds*, 50: 348-349; 53: 160 and 414).

Contrasting with this picture of decline there are welcome signs of some increase recently in Poland, where plates 23-25 were taken. This has been most marked in the last 30 years and is thought to be due mainly to better protection. Thus, according to data most kindly supplied by Adam Mrugasiewicz, of Wrocław University, the breeding population of Black Storks in Silesia, estimated at six pairs in 1905 and 1920, rose slightly to ten pairs in 1929, but by 1960 there were thought to be at least 26 pairs in Lower Silesia alone and in 1965 about 50 pairs in the whole of Silesia. The species has also spread recently in Poland to mountainous areas such as the Pieniny. In Poland, however, as over much of its European range, it is still a bird of lowland woods and forests with rivers, lakes or marshy areas. Such a region is the Barycz valley (Mrugasiewicz and Witkowski 1962), which in 1960 held at least 15 nests and another five pairs thought to be breeding. Here the Black Storks usually return to their nesting territories in early April, though in some years they may appear in late March and in others not until the beginning of May. They soon begin to build their nests, bulky affairs of sticks and twigs, reinforced with earth and grass, and lined characteristically with soft green moss. They will often repair old nests or make use of the disused structure of some bird of prey. Unlike the frequently colonial White Stork, their nests are always well scattered, though foraging adults from different nests will feed together where food is plentiful. In the Barycz valley old oaks, growing among alders and sedge in damp hollows, are the favourite nest-sites; elsewhere, other trees may be used, often conifers, as shown in plates 23 and 24a which were taken in Koszalin province, in north Poland. The nests are rarely built at the tops of trees, and in the Barycz valley

may be found from as low as twelve feet up to about 40 feet. In one part of the Soviet Union, east Transcaucasia, where it is most abundant, the Black Stork nests near human habitations, sometimes even in villages; in other parts, nests have been reported close together, occasionally two in one tree (Harber 1955).

The Black Stork is, however, not restricted to such moist wooded habitats. It breeds in treeless and mountainous areas in Mongolia, in arid Spanish valleys with little more than scrub, and there is an isolated breeding outpost in the Drakenberg mountains of Natal in South Africa. In such areas nests are found on ledges on cliffs or in shallow caves; Bernaldo de Quiros (1957) included an excellent sketch of such a nest in Estremadura, Spain, built on bare rock beneath a great overhang and over half-a-mile from the nearest small river. Cliff nests may also be found in well-wooded regions, such as the west Carpathian range in Slovakia at over 3,000 feet (Stollman 1961).

In the Barycz valley eggs are usually laid in April, though sometimes not until May. The clutch there, as elsewhere, varies between three and five, with four eggs as the most frequent size. Incubation, in which the male takes part, has been reported as taking 32-38 and 35-46 days (Witherby *et al.* 1939-41); in north Poland, W. Puchalski recorded 35-36 days. The young, which are fed by both parents, require 63-71 days for fledging. Recent studies in the Barycz area have shown that, on average, about 80% of the eggs produce fledged young, or, when complete failures are excluded, about 3.4 young per nest. There are, however, very marked variations in nesting success in different years: in 1959 over 92% of the eggs laid produced fledged young, whereas in 1963 only 31% did so. Losses are heaviest in cold and wet seasons when the birds arrive late, breeding is not synchronised and many eggs fail to hatch. Other losses are caused through immature birds trying to take over occupied nests (Black Storks do not breed until their third year), with the result that the eggs are sometimes destroyed in the struggle; and through the attentions of predators, especially Pine Martens *Martes martes*.

The behaviour of the Black Stork at the nest differs in one striking way from its relative: the clapping of the bill, such a distinctive feature of the greeting ceremony of the White Stork, is rare and the curious throwing back of the head associated with it (plate 26) is absent. L. Siewert, in his book *Störche* (quoted in Bannerman 1953-63) reported two observers with over 30 years' experience of the species who had never known the adults to clapper their bills. He described how, when the male arrives to relieve the female, the white under tail-coverts are spread and a clear call, *che lee, che lee*, is uttered. However, F. E. Stoll (quoted in Witherby *et al.* 1939-41) found that both adults and young will clapper in moments of great excitement. When ringing the young

in Poland, I found the differences in the reaction of the two species most striking: unfledged White Storks, black-billed with white plumage, were quite passive and silent when handled in the nest, whereas nestling Black Storks, also white but with larger yellow bills (plate 23), struggled more and clattered their bills vigorously during the operation.

Inhabiting areas varying from damp woodlands to treeless mountains, Black Storks are equally diverse in their choice of food. In the Barycz valley they will travel up to six miles from the nest to forage in shallow pools in the woods, but they avoid the deeper fish-ponds. They bring mainly fish to their young, especially Burbot *Lota lota* and loach *Cobitis spp.* Elsewhere their food has been reported as consisting chiefly of fish, but they also eat frogs and tadpoles and, less frequently, lizards, snakes, newts, worms, leeches and insects, with occasional small mammals and some vegetable matter (Witherby *et al.* 1939-41).

Black Storks leave the breeding areas and fly to their winter quarters in flocks which are normally smaller than those of White Storks. On arrival they tend to split up and lead a solitary existence, though large winter flocks have been reported in India and Palestine. Ringing recoveries and field observations (given in detail in Bannerman 1953-63) show that those from northern Europe may move south-west through France and Spain, south-east through Hungary and Rumania, or due south across the central Mediterranean via Sardinia, Sicily and Malta. Their winter quarters appear to be mainly in eastern Africa, extending, in the view of some authorities (Witherby *et al.* 1939-41, Voous 1960), into southern Africa, though Bannerman believes that they scarcely reach the Equator in their normal migrations. Some of the Asiatic breeding population may also move to Africa in the winter, but others have been recorded in India, Japan and southern Asia.

STANLEY CRAMP

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Notes

Weasel killing Kestrel.—I was interested in Mrs. Sybil Selwyn's observation of a Kestrel *Falco tinnunculus* which caught a Weasel *Mustela nivalis* and carried it up into the air, but then let it go (*Brit. Birds*, 59: 39). On 27th December 1930 I was watching a Kestrel hovering over Dartmoor, Devon. Suddenly it dropped to the ground about a hundred yards from me in a slight depression where I could not see it. It did not reappear and so, after a few seconds, I rushed to the spot. I got to within a few feet and then saw the Kestrel writhing and flapping about on the ground. It was locked in combat with a Weasel, so I stood still and watched. Soon the Kestrel's movements slowed down as the Weasel's grip on its neck proved fatal. Immediately it was dead, the Weasel dragged the body into a four-inch hole about six feet away. Before it disappeared I caught hold of the tail of the dead Kestrel to allow my wife, who was approaching, to see it. The Weasel still held on the Kestrel's neck even when I pulled the body out of the hole. I let go and the Kestrel was dragged out of sight.

A Short-tailed Field Vole *Microtus agrestis* lay dead where the fight had taken place. It is possible that the Weasel was carrying the vole when the Kestrel dropped on to it. My guess, however, is that the Weasel, in hunting the vole, had driven it out into the open where the Kestrel saw it and dropped on to it. The vole may thus have become the 'bone of contention' which caused the Weasel to attack the Kestrel when the latter was at some disadvantage. The result was the unusual spectacle of a fight to the finish between two well-matched predators.

H. G. HURRELL

[Mrs. Selwyn's observation and the fact that *The Handbook* includes the record of a Weasel among the prey of the Kestrel shows that this falcon has a chance of dealing successfully with a Weasel which it already has in its talons, but it is clear from Mr. Hurrell's interesting account that for a Kestrel to be attacked by a Weasel on the ground is a much more risky situation. With Mrs. Selwyn's note we quoted some weights of male and female Weasels; it should have been made clear that these were taken from *The Handbook of British Mammals* (1964) edited by H. N. Southern.—EDS.]

Turnstones scavenging after Oystercatchers.—At about 2.30 p.m. on 12th March 1965 a party of Oystercatchers *Haematopus ostralegus* and Turnstones *Arenaria interpres* were feeding on the beach near Exmouth, Devon. I was watching them through binoculars from the

cliff above. After one of the Oystercatchers had opened a bivalve, apparently a cockle *Cardium edule*, it was driven off by a second Oystercatcher which (to judge from its movements) ate the contents. When this bird had finished and moved away, a Turnstone ran up and began searching inside the shell with its bill; it retreated when the Oystercatcher threatened to return, but then came back to continue its scavenging. A few minutes later one of three Turnstones ran up to take over when another Oystercatcher finished dealing with a bivalve. Although I watched for about three-quarters of an hour, these were the only two cases of 'jackalling' that I saw. BRUCE CAMPBELL

Contact note of Spotted Redshank.—At Needs Oar Point, Hampshire, I have frequently heard Spotted Redshanks *Tringa erythropus* use a note that is not described in the standard reference books. This is a rather quiet, low-pitched conversational sound, not unlike a subdued quack, that could be written phonetically as *uck* or *oock*. I have heard the note mostly in autumn from flocks flying round the pools that they use as resting and feeding grounds, especially from groups that have just taken wing, but on one or two occasions from a party on the ground. Each individual seems to utter the note singly, but a flock of around a dozen will call at a combined frequency of two to three notes per second and so, as they pass overhead, the sound is continual. It seems clear that it is used to keep the individuals in contact with each other; the overwhelming impression is of 'conversation' between birds calling to and answering one another.

The Handbook describes a conversational *chee* from small parties flying round their feeding grounds, but that is clearly different from the guttural notes described above. J. H. TAVERNER

Accident to Swift.—C. M. Veysey's note on the death of a Swift *Apus apus* by drowning (*Brit. Birds*, 58: 471) reminded me of a comparable observation which I made on 23rd July 1965 at Eglwys Nynnid Reservoir, Glamorgan. I was watching a flock of about 20 Swifts hawking low over an adjacent hayfield when suddenly one of them appeared to spin round and drop into the grass, which was about 18 inches high. I could only assume that its wing had accidentally touched a piece of grass and that this was sufficient to unbalance it. When I found the bird, it was making futile attempts to take off and would certainly have had no chance of survival had I not been there.

R. G. NEWELL

Numbers of Skylarks flying inside lighted hangar in snowstorm.—The following incident may be of interest in connection with J.

Douglas Brown's recent observation of several dozen Skylarks *Alauda arvensis* which came into his lighted house at night during a snowstorm (*Brit. Birds*, 59: 40).

During a severe blizzard about 7.30 p.m. on 21st January 1965, at Shobdon Aerodrome, near Leominster, Herefordshire, an estimated total of more than a hundred Skylarks entered a lighted hangar, 240 feet long and 120 feet wide, through some open sliding doors. They flew round and round, and many fell to the floor exhausted, some no doubt having crashed into the girders overhead. At least twelve of these died, but over 20 recovered. The remainder must have settled on the hangar for the night because at daybreak they left through openings under the roof. I did not see the birds myself, but I was able to piece the story together after talking to workmen on the spot.

T. R. AMMONDS

[As a result of J. Douglas Brown's note referred to above, we have received several other reports of birds tapping at lighted windows at night, from R. H. Baillie, W. N. Gardener and Christopher J. Lowe. The species involved have included Goldcrest *Regulus regulus* and House Sparrow *Passer domesticus*, but only single birds in each case. A more interesting parallel to these large numbers of Skylarks has been sent to us by R. B. Warren. On 9th December 1948, during thick fog, Crows *Corvus frugilegus* coming to a large roost at Wickford, Essex, frequently beat against the lighted windows of a farmhouse 300 yards from the wood concerned.—EDS.]

Swallows living inside engineering works until late December.—

An earlier note of mine (*Brit. Birds*, 58: 98) described how a diminishing party of Swallows *Hirundo rustica* stayed inside a large engineering workshop near Corby, Northamptonshire, until the end of November 1964. Much the same thing happened in 1965, except that this time the last one survived until almost the end of December.

In 1965 Swallows were first noted inside the works in mid-September. From then until mid-October a party of about 15 regularly roosted among the roof girders of the main welding bay each night, flying in and out of the building during the day. On 17th October, following a brief period of cooler weather and thick fog, all but two departed. Towards the end of October the thermostatically controlled heating inside the building was switched on, this coinciding with severe night frosts, freezing fog, rain or snow for much of the following month, and from that time on neither of the two remaining swallows was seen to leave the building. They lived in this way for more than seven weeks, apparently finding enough food to keep them going, but on the morning of 19th December only one remained and,

although no body was found, it was assumed that the other had died. The last survivor was active until the afternoon of 24th December, when it too died. As its weight was only 11.1 grams, it seems safe to assume that starvation was the cause.

Incidentally, this is the first record of Swallows in Northamptonshire in December.

N. L. HODSON

Mistle Thrush and Blackbird keeping other species away from food.—During 1964 a pair of Mistle Thrushes *Turdus viscivorus* nested near my parents' home at Chatham, Kent. A neighbour always puts out a plentiful supply of bread for birds, most of which is normally consumed by Starlings *Sturnus vulgaris*. However, while the female Mistle Thrush was incubating, the male spent much of the day on a clothes line above the lawn where the bread was deposited and he was extremely successful in keeping the Starlings away from the food by swooping down on any that approached. I saw him drive off as many as nine at once. As a result, when the female Mistle Thrush left the nest for food, there was a plentiful supply which she could gobble down in a minute or two.

In addition, this male Mistle Thrush kept away the resident pairs of Blackbirds *T. merula* and Song Thrushes *T. philomelos*. The male Blackbird also began to drive off Starlings from the lesser amounts of food deposited in my parents' garden, but he could manage only three at a time. This seems worth recording because Dr. D. W. Snow in his *A Study of Blackbirds* (1958, page 32) stated that the Starling usually gets the better of any argument between these two species over food. This Blackbird also drove off the Song Thrushes. I have on other occasions observed male Blackbirds to be dominant over Fieldfares *T. pilaris*, particularly on the lawn of King's College, Cambridge, in the mid-1950's; this again is contrary to the more usual state recorded by Snow.

It is also worth noting that both the male Mistle Thrush and the male Blackbird at Chatham almost completely ignored such small birds as House Sparrows *Passer domesticus* which were able to feed unmolested.

J. ROBBINS

Blackbird repeatedly throwing leaf into air.—On two occasions in December 1965, in my garden at Woodthorpe, Nottingham, I saw a first-winter male Blackbird *Turdus merula* which had defended a territory there since October seize a dead laurel leaf with a stiff, jerky action and slightly flicking wings. Next, after a movement best described as 'a hop, a skip and a jump', he tossed the leaf into the air, quickly followed it and, retrieving it from the ground, worried it as a dog does a bone. These actions were repeated three or four times, but so quickly that

the whole sequence lasted only about twenty seconds on each occasion. During this time the bird and the leaf travelled some three or four yards.

A. DOBBS

[Dr. D. W. Snow has commented as follows: 'The observation seems unusual in so far as the Blackbird threw the leaf into the air. "Leaf-brandishing" is more normal, though still not common. There are several references to leaf-brandishing in my book *A Study of Blackbirds* (1958) and also in an illustrated article on "Blackbird antics" by the Reverend Edward A. Armstrong (*Countryman*, 55: 88-93), but I never saw a Blackbird in the Botanic Garden at Oxford brandish a leaf during the period of my study (though I did note it there later). It is evidently an individual characteristic and certainly rather puzzling.'—EDS.]

Unusual song of Willow Warbler.—On 24th June 1965, in Abernethy Forest, Inverness-shire, we heard an unfamiliar tit-like song from what proved to be a *Phylloscopus* warbler singing in a pine. The song, which varied in length from three to seven or eight notes, was reminiscent of the repeated call of a Goldcrest *Regulus regulus*, but was lower pitched and in some ways also resembled the nasal call of a Marsh Tit *Parus palustris* without being so harsh. The two of us wrote it down as *xi-xi-xi* and *chi-chi-chi* respectively. The song was performed with wing-shivering movements resembling those of a Wood Warbler *P. sibilatrix* and, in all, was repeated ten to fifteen times.

The bird itself was indistinguishable from several Willow Warblers *P. trochilus* in the area and its call-notes were also typical of that species. No *Phylloscopus* described in *The Handbook*, the *Field Guide*, or Kenneth Williamson's *Identification for Ringers*, 2: *The Genus Phylloscopus* (1962) fits the above combination of song and plumage. We therefore consider that the bird must have been a Willow Warbler with an aberrant or possibly imitative song. D. A. Bannerman, in *The Birds of the British Isles*, vol. 3 (1954), quoted an instance of an Arctic Warbler *P. borealis* imitating the song of a Siberian Tit *Parus cinctus*, but there seems to be no record of a Willow Warbler imitating another species. We should like to thank Kenneth Williamson for his help and advice.

A. S. CHEKE and H. A. FORD

[A record of a Whitethroat *Sylvia communis* with an atypical song was published two years ago (*Brit. Birds*, 57: 204-205).—EDS.]

Radde's Warbler in Suffolk.—On 4th October 1964, after a few days of north-easterly winds, a Radde's Warbler *Phylloscopus schwarzi* was caught in a mist-net in a belt of willow scrub on the edge of the reed

bed at Walberswick, Suffolk. It was not seen beforehand. The following description was taken:

Upper-parts: generally dark olive-green, darker on head and greener on rump; wing-coverts and upper tail-coverts also dark olive-green; primaries, secondaries and tail-feathers dark brown. *Sides of head:* creamy supercilium extending nearly to nape; dark brown eye-stripe; cheeks washed with buff. *Under-parts:* throat white, tinged yellow; upper breast brown; flanks buff; belly pale, tinged sulphur yellow; under tail-coverts light orange-buff. *Soft parts:* bill short, stout and dark brown; legs thick and light-coloured. *Measurements:* wing 57 mm., tail 53 mm. (outer pair 5 mm. shorter than middle pair), tarsus 21.5 mm., bill (from skull) 12 mm.; weight 10 grams. *Wing-formula:* 4th and 5th primaries equal and longest, 3rd — 1 mm., 6th — 1.5 mm., 7th — 3 mm., 8th — 6 mm., 9th — 8 mm., 2nd — 9 mm., 10th — 10 mm., 1st in pin; 3rd to 6th emarginated.

In the hand the bird uttered a soft *tic* recalling that of a *Sylvia* warbler. Other observers who examined it included H. E. Axell, Mr. and Mrs. F. K. Cobb, and R. Briggs. When released it flew off into some undergrowth and was not seen again. This is the fifth British record of Radde's Warbler and the fourth since 1961.

G. L. CLARKE and D. J. PEARSON

Spotted Flycatcher laying six eggs over thirteen or more days.—

On 31st May 1959 the nest of a pair of Spotted Flycatchers *Muscicapa striata* in my garden at Tadworth, Surrey, contained two eggs. It still held only two on 5th June and, had it not been for the presence of both adults near the nest, I would have supposed that it had been forsaken. However, the clutch had risen to four by 9th June and to six two days later, whereupon incubation began.

I can suggest no explanation why the completion of the clutch was so long delayed. It might have been thought that a clutch of four eggs was laid during 8th-11th June in a nest which already contained a deserted clutch of two, but what were apparently the same birds were constantly in the vicinity of the nest from the time the first two eggs were laid and, in any case, all six eggs later hatched. Five of this large brood fledged and the corpse of the sixth one was almost fully feathered.

HOWARD BENTHAM

Pied Wagtail persistently attacking the corpse of another.—An earlier note of mine (*Brit. Birds*, 57: 329-330) described my observations on a male Pied Wagtail *Motacilla alba* which killed another and then attacked the corpse at intervals over a period of three days, piercing the skull and eating the brains in the process. This happened in March 1964 in one of the park greenhouses at Cheam, Surrey.

On 23rd and 24th November 1965 a similar sequence of events took

place in one of the same greenhouses. Attracted by the sound of a bird in distress on the first of these two days, I found a Pied Wagtail perched on top of another and viciously attacking it. I frightened off the aggressor and picked up the victim which was so badly injured about the head and eyes, and obviously dying, that I decided to kill it. Then, remembering the persistent attacks in the previous year, I left the corpse on the staging to see what would happen. The other Pied Wagtail had been perched all this time about ten feet away and came straight back when I left. As on the previous occasion, it darted in from about a foot away and attacked the head and also the back of the corpse. It then broke off to clean its beak and drink from a puddle on the floor. Next it stood near the corpse, bobbing its head up and down and then stretching up its neck, after which it resumed its attacks. I was able to approach to within about three feet and obtained several photographs.

I left the dead bird in the greenhouse and the next day the aggressor resumed its attacks for a short period in the morning but, after that, ignored it. By this time the corpse had hardly any feathers on the top of its head and I removed it. The attacks were also witnessed by D. Holmes. I might add that a pair of Pied Wagtails had nested in this very greenhouse in 1965. D. JOSLIN

[From the photographs which Mr. Joslin has kindly shown to us, it appears that the aggressor was a sub-adult male and therefore not the same individual as in 1964.—EDS.]

Mutual feeding by Waxwings in winter.—At about 2.45 p.m. on 1st December 1965, at Farnham, Surrey, Mr. and Mrs. P. G. Davis, Miss Chilton Thomas and I watched a pair of Waxwings *Bombycilla garrulus* presenting food to each other in a hawthorn *Crataegus monogyna*. The male took a haw from the tree, hopped close to the female and passed it into her beak. They hopped from twig to twig around each other and then she gave it back to him. A minute or two later they were each offering the other some greenish matter which was obviously the crushed berry, but neither took any as both their beaks were now full with the pulp. Throughout the time we were watching, their crests were raised high, their grey lower backs were puffed up, and they were quivering their wings slightly. After about three minutes they flew away together. It seemed an extraordinary time of year for mutual feeding of this kind. MARGARET M. HUTCHINSON

[I have seen similar behaviour on one occasion in winter in Norfolk (and also in the breeding season in Finland). However, R. K. Cornwallis cannot recall a comparable case among the large number of

records which he handled in connection with his paper on 'Four invasions of Waxwings during 1956-60' (*Brit. Birds*, 54: 1-30). Similarly, R. P. Bagnall-Oakeley, who has had much experience of Waxwings in Norfolk over the years, has only one record of this behaviour and that was as late as early May when a party of six Waxwings stayed at Holt, Norfolk, until 11th May 1957. Four of these birds were clearly paired and he saw mutual feeding with buds of beech *Fagus sylvatica* and whitebeam *Sorbus aria*. This happened on a number of occasions and the food they passed to each other was always a pulpy, viscous, greenish mass. Crests were raised, wings quivered, and tails fanned and slowly elevated and depressed.

The display posture recorded above by Miss Hutchinson is similar to that described by F. M. Meaden and C. J. O. Harrison in their paper on 'Courtship display in the Waxwing' (*Brit. Birds*, 58: 206-208). Mr. Harrison tells us that brief, casual feeding of the kind described by Miss Hutchinson does occur among aviary Waxwings during the winter. He adds that some form of pair-bond possibly persists throughout this period.

We take this opportunity of reminding readers that the unusually large invasion of Waxwings in the 1965/66 winter (*Brit. Birds*, 58: 478-479 and 527) is being analysed by R. K. Cornwallis and A. D. Townsend, and we hope that all records will be sent to the latter at 11 Bassingham Crescent, Lincoln.—I.J.F.-L.]

House Sparrows regularly eating hive bees.—I have kept hive bees *Apis mellifica* for many years at my home near Manningtree, Essex, but I never saw House Sparrows *Passer domesticus* catching them until the summer of 1965. Then, however, both males and females made a regular practice of it. They would sit on the alighting boards of the hives and snatch worker bees as they came in. When a sparrow had caught a bee, it would fly a short distance with it and then crush and eat it. At the height of the breeding season they took the bees to their nests in adjacent conifers, presumably as food for the young. The greatest number of House Sparrows I saw feeding in this way at any one time was four, but it is quite possible that more were involved as they seemed to be taking the bees all day and every day. This went on for several weeks and diminished only at the approach of autumn.

MARY G. TURNER

[It is interesting that, once they had discovered this source of food, the House Sparrows should then have exploited it so regularly and for so long. Dr. J. D. Summers-Smith, author of *The House Sparrow* (1963), knows of only one published record of the species feeding on

hive bees in this way. This is a note by Sister Veronica on 'Sparrows and bees' (*Nature*, 134: 420) which described House Sparrows of both sexes taking helpless drones from the alighting board of a hive at Milngavie, near Glasgow, in July 1934. As in the case described by Miss Turner, these House Sparrows both ate the bees themselves and fed them to their young. Dr. Summers-Smith adds that W. B. Barrows in his *The English Sparrow in North America* (1889) mentioned some records of sparrows taking both wild and domestic bees, but gave no details. *The Handbook* includes Hymenoptera among the prey of this species, but this seems more likely to refer to ants.—EDS.]

Review

Bird Migration: the Biology and Physics of Orientation Behaviour. By Donald R. Griffin. Science Study Series, No. 32. Heinemann, London, 1965. xv+180 pages; 27 text-figures. 12s. 6d. (paperback 8s. 6d.).

The author's interests are clearly better represented by the sub-title. Nevertheless, he does his duty by the broader subject and devotes a third of the book to sketching in the outlines of the characteristics of migration and the general investigations of recent years, particularly those using new techniques such as radar.

The various theories of bird orientation are discussed, generally without much enthusiasm. The basic evidence of homing experiments is then set out. In these experiments, breeding birds are removed from their nests, sometimes to distances of several thousand miles, and the speed and completeness of their returns are studied. Dr. Griffin himself made valuable contributions in this field and initiated the revival of interest in bird navigation (as well as, incidentally, coining this term). The relatively slow returns of his birds, and of those of other workers in that era, led him to consider whether homing could not be explained on the basis of a random search for landmarks—molecular navigation. In a bold attempt to obtain crucial data on whether the homing flight was directed or meandering, he learnt to fly a light aircraft and pursued homing gulls, Gannets and pigeons. This chapter is particularly evocative and we learn that research can be an adventure in more ways than one. Surreptitious sorties over international boundaries, fuel shortage just at the most interesting moment, finger trouble at small-town airports—these are but a few of the trials he faced.

In a way one turns with regret from aerial pursuits to the prosaic approaches used in Europe—simply recording the direction of flight of birds from the release point or when confined in small circular cages. However, it was by the use of such methods that it was firmly established that birds have the ability to detect compass directions and, even more remarkable, that some species show directed flight towards home from any direction in previously unknown territory. The astronomical basis of the compass orientation is now generally accepted and the experiments that proved the use of sun and stars are delineated in some detail. Dr. Griffin is properly more cautious in accepting hypotheses of complete navigation, that is to say position fixing, with reference to astronomical features.

Indeed, he returns smartly to the inherited compass orientation as illustrated by records of naive young migrants caught and translocated far to one side of the normal migration axis. Such fixed orientation is of obvious relevance to migratory behaviour. Less so is 'puzzling directional orientation', also known as 'nonsense orientation'. Again Dr. Griffin himself was the first to demonstrate strongly marked orientation which did not coincide with the directions of home or of migration. While their function remains obscure, these orientations have proved most useful for experimental investigations, as witness a final factual section on North Star Mallards. We end with a quick look in the crystal ball to see what likely developments there are in terms of technique. These include bird-borne radio transmitters tracked by aircraft-borne receivers, now in actual use.

This is not, and clearly was not intended to be, a definitive work on the subject. It very adequately serves as a readable and stimulating survey for those who have not access to or the inclination to read the original experimental reports. Those who wish to follow up the leads given are provided with a select reading list.

G. V. T. MATTHEWS

Letters

The spread of potato-eating in Whooper Swans

Sirs,—A tendency for flocks of up to 40 Whooper Swans *Cygnus cygnus* to feed inland is well attested in early European literature; and in Scotland these swans, like geese, occasionally fly some miles from water to feed in stubbles or well-grown pasture. In recent winters they have

also been found grazing winter wheat fields, although only in small numbers and only in certain localities in the areas of the Tay and Forth, where influxes of Whooper Swans have been recorded over the last half-century (Boyd and Eltringham 1962).

Winter wheat commonly follows potatoes in farming rotation and decaying waste potatoes are found lying on the surface of the fields. These tubers have probably been eaten sporadically in young wheat fields for some time, but only since the severe winters (and consequent food shortages) of the 1940's have Whooper Swans flown into harvested fields before any wheat has sprouted, purely to eat potatoes. The habit is regular nowadays only in Perthshire and Angus, although Baxter and Rintoul (1953) wrote of two Whoopers feeding on potatoes from a rubbish dump in Ross, and in 1961 potato-eating was recorded in fields in Aberdeenshire (Kear 1963).

There are now indications that the new habit is spreading to England, where Whooper Swans are relatively less common. A flock of eleven was feeding on stubbles at Wainfleet, Lincolnshire, in January 1965 and six (five adults and one cygnet) were seen grazing autumn drilled wheat and eating potatoes in a field at Friskney, Lincolnshire, for at least three weeks in January 1966. Potato-eating in southern Lincolnshire has been the prerogative of Pink-footed Geese *Anser brachyrhynchus* since the late 1920's, but it seems that the swans are able to gouge out and cut up the tubers for swallowing even more easily than the geese. Undoubtedly their powerful bills and strong lamellae are of assistance here and it is interesting, and important for the farmer, that these swans graze wheat without damage to the plant by clipping, rather than by pulling as they do water-weeds.

May we appeal to readers of *British Birds* to send to the Wildfowl Trust, Slimbridge, Gloucestershire, any records they may have of Whooper Swans eating potatoes and to watch for evidence of a further spread in the habit?

R. E. M. PILCHER and JANET KEAR

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Birds trapped by sludge or mud

Sirs,—As Lancashire bird-watchers with a combined total of 100 years' experience of the Ribble estuary, Inner Ribble marshes and particularly Freckleton sewage farm between 1946 and the present time, we were

amazed by M. Greenhalgh's claims (*Brit. Birds*, 59: 44) to have noted not only most of G. L. Webber's interesting list of birds trapped by sludge (*Brit. Birds*, 58: 296-297) but several other waders likewise caught by sludge or estuarine mud at the above localities.

It would appear from Mr. Greenhalgh's letter that to find waders and some other species trapped in this way on the Ribble is not uncommon. Our experience has been different. H.S. has one record of a Ringed Plover *Charadrius hiaticula* and M.J. one record of a Swallow *Hirundo rustica* trapped by sludge at Freckleton sewage farm in, respectively, 20 and 14 years of regular visits. None of us has ever recorded a wader stuck in mud on the Ribble estuary despite frequent visits over a long period.

It is our experience that waders frequently test the surface of 'doubtful' mud with their feet, while flapping with their wings, before they put their weight down fully. In this way they avoid getting trapped, but it is possible that such behaviour may give rise to the false impression that they are already caught.

H. ANDREWS	N. HARWOOD	H. SHORROCK
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News and comment

Edited by J. L. F. Parslow

An ornithological atlas?—The possibilities of undertaking an ornithological atlas of the British Isles, along the lines of the Botanical Society of the British Isles's *Atlas of the British Flora*, are at present being explored by the British Trust for Ornithology. As Dr. David Snow points out in the February issue of *B.T.O. News*, the greatest value of such an atlas would be as a basic record for measuring future changes in distribution among our breeding birds. With an increasing human population, the likelihood of drastic changes in agriculture and other forms of land use, and, as the climatologists enjoy warning us, the possibility of a severe climatic recession, it seems probable that there will be greater changes in our avifauna in the relatively near future than have ever occurred in the recent past. The basic unit of an atlas would be the conveniently sized 10-kilometre square of the national grid, for which a special machine for printing dot-distribution maps is available at the Nature Conservancy's Monks Wood Experimental Station. There are about 3,500 such squares in the British Isles, and in the course of their survey the botanists were able to visit all but seven of them. In order to achieve anything approaching this sort of extensive cover, it seems essential that an ornithological enquiry should be framed in straightforward enough terms to enable casual bird-watchers and also

foresters and farmers to take part and contribute usefully to it. On the other hand, there are obviously many complicating factors (such as the necessity to distinguish between birds definitely breeding and those which are not) which do not arise in other natural history surveys, while it also seems desirable that some indication of abundance should be obtained. In order to gain more experience of the problems involved, the B.T.O. (Beech Grove, Tring, Hertfordshire) is running an experimental pilot survey during 1966, in which interested observers are invited to take part. There can be little doubt that widescale popular support would be forthcoming from amateur ornithologists willing to contribute information towards a distribution atlas. The key question is whether this support would still be sufficiently extensive, experienced and widely distributed geographically to make such a project feasible and worth-while.

Ornithological expeditions to the Mediterranean region.—This year, and particularly this spring, will see a number of mainly British expeditions in the field, especially in an area which for the sake of brevity is here termed the 'Mediterranean region', but which in fact extends from south-west Spain to as far east as Turkey and the interior of Jordan, and as far south as the central Sahara. Some of these expeditions will already be well under way, or even have been completed, by the time this appears in print.

Returning to North Africa for the fourth successive spring, E. D. H. Johnson and his wife are in the field from about 12th March to 28th April, following up their previous work on migration at Oued Keneg Grou and Figuig in Morocco, and will later team up with A. Dupuy and Dr. James Monk at Benni Abbes in Algeria, where a temporary observatory and ringing station is to be established. From Benni Abbes they propose to make a journey to Bidon V in central Sahara to observe migration there. A second party, led by C. Headlam and including C. A. Walker and L. Yeatman, all of whom were concerned in the previous year's expeditions to Morocco, are spending about 15 days at an observatory camp at Oued Keneg Grou, while a third team led by V. W. Smith intends crossing the Sahara from Kano in Nigeria, making observations *en route* (particularly in the Ahaggar Massif) and later in April and early May at Figuig. Various other parties, chiefly French, will be observing migration in Arabia, Libya and Tunisia, and there is to be a German contribution to the south of the Great Atlas.

For the third year in four, a scientific expedition is visiting the Azraq depression in Jordan between 20th April and 15th May. International in membership and sponsored by the International Biological Programme and the Jordan government, it is to be led by Dr. J. Morton Boyd of the Nature Conservancy. The study programme consists mainly of a final reconnaissance of various natural sciences so far hardly covered by previous workers. However, the ornithological research will continue with special emphasis on ringing and breeding studies. These tasks will be carried out by Dr. J. S. Ash, I. J. Ferguson-Lees, Robert Spencer and D. I. M. Wallace; Stanley Cramp will also be joining the party at Azraq at the beginning of May.

The Coto Doñana in southern Spain has seen a number of British expeditions in recent years, but none of these has been in early spring. The main aims of a party consisting of Peter Davis, G. Pepler, B. R. Spence and Miss P. Harrison were to obtain a record of migration in the area between 25th March and 13th April and to carry out a programme of ringing migrant and resident birds as a contribution towards the scientific work on the reserve. H. E. Axell, warden of Minsmere, Suffolk, has been seconded by the Royal Society for the Protection of Birds to the Coto Doñana reserve for a period of two months from mid-March at the suggestion of the International Biological Programme. His task will be to advise and

instruct the guards there in the problems of management, including the building of hides, the placing of paths and trails, and the guidance of visitors.

Lastly, but certainly not least in terms of the amount of time to be spent in the field, M. J. Helps, A. R. Kitson, R. F. Porter and I. R. Willis are mounting an expedition to Turkey for a full seven months starting in May. The party has two aims. Firstly, a study of the breeding birds in and around the area of the Manyas Golu, near Bursa, and of the coastal stretch extending possibly as far south as Ismir; and, secondly, a study of migration (especially that of raptors) at the Bosphorus from August to November.

A list of the birds of Ayrshire.—Up-to-date detailed information on the status and distribution of birds in Scotland is so sparse that almost any local list that is published has immediate value; one that covers an entire county and includes a critical survey of the past literature is especially noteworthy. G. A. Richard's *Check-list of the Birds of Ayrshire* comes into this latter category and will thus be welcomed by everyone interested in the distribution of birds in Scotland. The list has been produced primarily for private circulation and copies have been deposited in the libraries of the Edward Grey Institute, the British Trust for Ornithology and the Scottish Ornithologists' Club. In addition, a very limited number are available, price 4s. post free, from G. A. Richards, 29 Fullarton Road, Prestwick, Ayrshire. The list has been cyclostyled (unfortunately rather faintly, which makes the print difficult to read) and it is to be hoped that it can eventually be published in a more permanent form.

The Seabird Group.—The Seabird Group, initially set up as an informal body (see *Brit. Birds*, 58: 447), was formally constituted at an inaugural meeting held at New College, Oxford, on 8th January 1966. Its formation has the approval of the three main national ornithological organisations, each of which is represented on the Group's executive committee. The Group's chairman is Dr. G. M. Dunnet (the nominated representative of the British Ornithologists' Union) and its secretary is Dr. W. R. P. Bourne. An annual subscription of £1 (10s. for full-time students) entitles members to participate in a variety of meetings and other activities, and to receive copies of a cyclostyled bulletin which is to be produced approximately twice a year. Among other activities planned for this year, the Group hopes to be able to arrange accommodation for an experienced ornithologist on board H.M.S. *Vidal* during a survey exercise which will involve a series of crossings of the northern North Atlantic between 16th June and 6th September. Anyone interested in this opportunity, in helping seabird enquiries or in obtaining further information about the Seabird Group, should write to its honorary secretary, c/o The B.O.U., British Museum (Natural History), London S.W.7.

Bird specimens required for museum skin collections.—Many provincial museums throughout the country contain collections of bird skins and it may not be generally known to field ornithologists that most of these museums would welcome specimens of birds found dead, if they are suitable for being made into skins. A useful, up-to-date list of local museums having bird collections, and also specifying those which require new material, was recently compiled by G. Stanfield and can be found in *Bird Study*, 12: 129-132. More specifically, Dr. F. S. Wallis, conservation officer for the Museum Council for the South West, has asked us to publicise a request for any specimens of freshly dead birds or small mammals to be sent to their taxidermist, J. J. Heath, City Museum, Bristol 8. The Museum Council supplies a large number of museums and school services with mounted specimens and cabinet skins and requires a constant supply of fresh material. Specimens should be wrapped in paper, not polythene, and postage will be refunded if requested.



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May
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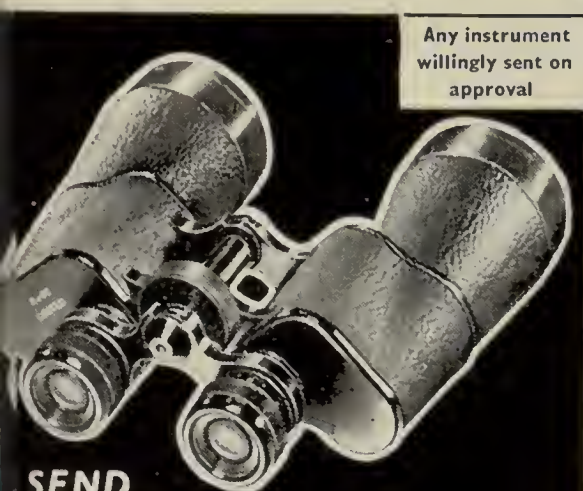
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British Birds

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MAY 1966



The winter feeding of the Purple Sandpiper

By C. J. Feare

Wellcome Marine Laboratory, Robin Hood's Bay, Yorkshire

INTRODUCTION

IN THE PAST, studies of the feeding habits of shore birds have largely been concerned with a bird species and one prey species at a time. A series of papers by Dewar (1908, 1910, 1913) described the predation of Oystercatchers *Haematopus ostralegus* on mussels *Mytilus edulis*, dogwhelks *Thais* (= *Nucella* or *Purpura*) *lapillus* and limpets *Patella* spp. More recent studies of the Oystercatcher by Drinnan (1957, 1958) were stimulated by economic interest and centred upon its predation on cockles *Cardium edule* and mussels respectively. Drinnan noted that the subject of shore birds had had little attention from marine biologists; and, in fact, these birds have received only passing mention in works on littoral ecology (e.g. Yonge 1949, Lewis 1964).

The present paper is an attempt to study the Purple Sandpiper *Calidris maritima* as an integral part of the littoral fauna of a rocky shore. The results obtained have convinced me that this species, with several others commonly found on similar shores should, at least during the winter, be regarded as littoral organisms.

ROBIN HOOD'S BAY

The opportunity for me to study Purple Sandpipers presented itself when a party of 39 arrived in Robin Hood's Bay, North Yorkshire, on 4th November 1965. They remained in the area until 13th January 1966, after which they began to wander up and down the coast. A

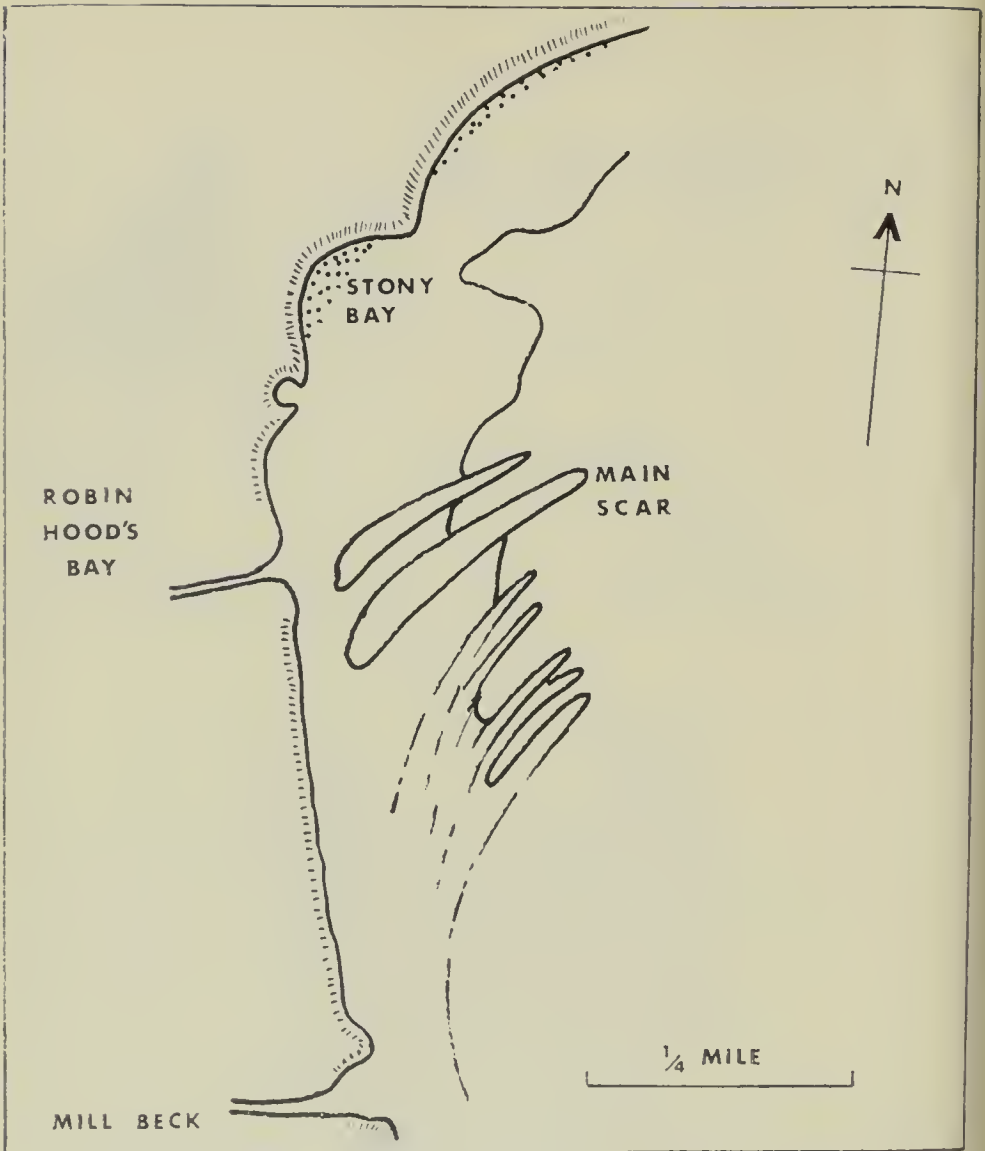


FIG. 1. Sketch map of Robin Hood's Bay, North Yorkshire

party of similar size was present on Filey Brig, East Yorkshire, during the same period and my work at Robin Hood's Bay was supplemented with information I obtained at Filey.

The shore at Robin Hood's Bay (fig. 1) is relatively sheltered, and the shale scars carry dense populations of winkles *Littorina* spp., dogwhelks, limpets *Patella vulgata* and barnacles *Balanus balanoides*. Below mean tide level are areas of small mussels which during the study period supported very young shore crabs *Carcinus maenas*. The scars are completely covered at high water and small bays to the north of the village

WINTER FEEDING OF PURPLE SANDPIPER

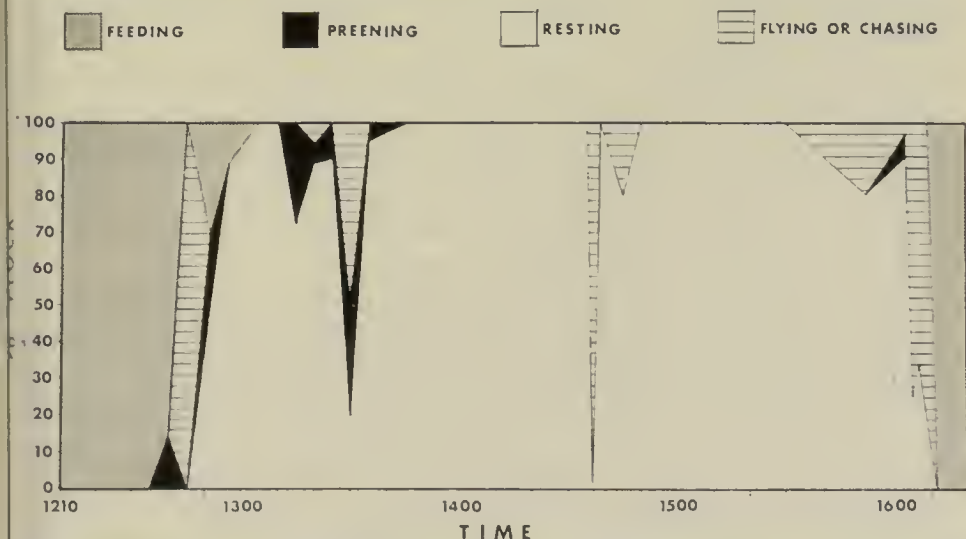
then become inaccessible. These bays have narrow, sandy beaches just above the shale, which grade into a stony bank at the base of unstable mud cliffs.

METHODS

Faeces of Purple Sandpipers were collected at various states of the tide. At seven levels of the shore at least five droppings were taken and examined under a low power microscope, through which it was possible to identify and count whatever remained of animals eaten. In all, 135 droppings were examined. In order to minimise disturbance, faeces were never collected until the Purple Sandpipers had left the immediate area. The only other birds feeding in the vicinity were gulls *Larus spp.*, Oystercatchers and Rock Pipits *Anthus spinoletta*, and Purple Sandpiper droppings were readily distinguishable by their size.

Hartley (1948) and Lack (1954) regarded the examination of faeces for determining a bird's diet as a sampling technique which should be used only as a last resort. However, Purple Sandpipers take small items of food and through binoculars one cannot distinguish between the winkles and dogwhelks they pick up. Furthermore, neither of these Yorkshire flocks was large enough to enable me to take a reasonable sample of birds for gizzard examination at each level of the shore.

One Purple Sandpiper was shot; formalin was immediately syringed down the throat (see van Koersveld 1950) and the gizzard was removed and placed in formalin. From the examination of this gizzard the diet determined by faecal examination appeared to be wholly representative of what was actually eaten. This is of course due to the nature of the diet, which will be described later.



G. 2. Behaviour of flock of Purple Sandpipers *Calidris maritima* over high tide Filey Brig, East Yorkshire, on 18th November 1965 (high water at 14.17 hours)

Observations were made with the aid of a stop watch on the rate of feeding and on the frequency of disturbances by waves.

FEEDING ROUTINE

The Purple Sandpipers spent the whole of the daylight period feeding when the state of the tide permitted. At high water the Filey flock was seen to rest among stones after a brief period of preening and chasing (fig. 2). It was not possible to watch the Robin Hood's Bay birds at high tide. When they were driven to the narrow zone of bladder wrack *Fucus vesiculosus* at the top of the scars they began preening. As soon as this *Fucus* zone was being regularly splashed, they flew to a stony bay which by this time was inaccessible to me and I assume that they rested there.

They appeared to rest at night, none being found feeding after dark. High tides prevented them from feeding for about three hours each day and in December this left only six daylight hours for feeding. In order to obtain sufficient food in these circumstances they must spend practically the whole of the available time feeding.

In feeding they probed in crevices and small pools amongst mussels and barnacles along the water line, and followed the tide in and out. Feeding time was reduced by waves and stormy weather, as will be described in a later section, but it was also reduced by behavioural disturbances which were seen to occur before and after a high tide, and more pronouncedly at dusk. At these times the birds were restless and, besides preening, individuals began chasing one another. At dusk the flock moved to the sand in front of their stony resting place. Even when they were not involved in chases they fed only half-heartedly, and the timed feeding rate fell considerably (see RATES OF FEEDING on page 175).

On 2nd December 1965, after a high tide, about half-a-dozen Purple Sandpipers were seen performing what Witherby *et al.* (1938-41) described as the 'wing ceremony'. Those concerned raised both wings vertically and then jumped into the air or chased other individuals with neck held low and outstretched. This was the only occasion on which this display was seen.

At dusk, and at the approach of and just after a high tide, Purple Sandpipers will have difficulty in finding food owing to bad light and a restricted feeding area respectively. The apparent scarcity of food at these times may lead to intraspecific competition for food, manifesting itself in displays and chases. Thus the evening rise in activity of these birds may be caused by this inability to find food, rather than by a direct effect of light intensity.

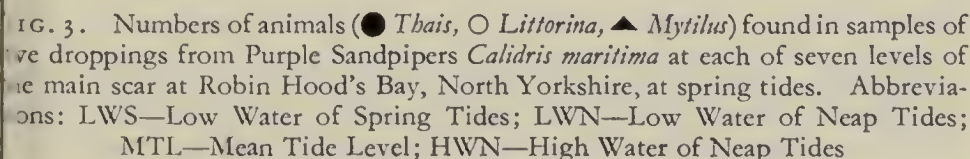
Apart from these periods before and after a high tide and at dusk (and presumably dawn), the whole of the daylight period was spent

Analysis of faeces showed that the diet consisted almost entirely of molluscs, gastropods being the most severely predated littoral organisms. *Littorina littorea*, *L. saxatilis* and *Thais lapillus* predominated, but *L. littoralis*, *Hydrobia ventrosa* and *Mytilus edulis* were also taken. It was not possible to produce a reliable estimate of the size of snail eaten from the fragments found in the faeces, but with the exceptions of *Littorina saxatilis* and *Hydrobia ventrosa* all snails eaten were in their first year, and the largest snail found to have been eaten was a specimen of *Thais lapillus* with a shell length of 8-10 mm.

Claws, eyes and pieces of carapace of small crabs were found in the pieces, corresponding to animals with a shell width of 5-7 mm.

Fragments of the green weeds *Enteromorpha intestinalis* and *Ulva lactuca* were frequently found.

The largely gastropod diet was confirmed by the examination of the gizzard, which contained 43 *Littorina saxatilis* and three *L. littorea*, plus



BRITISH BIRDS

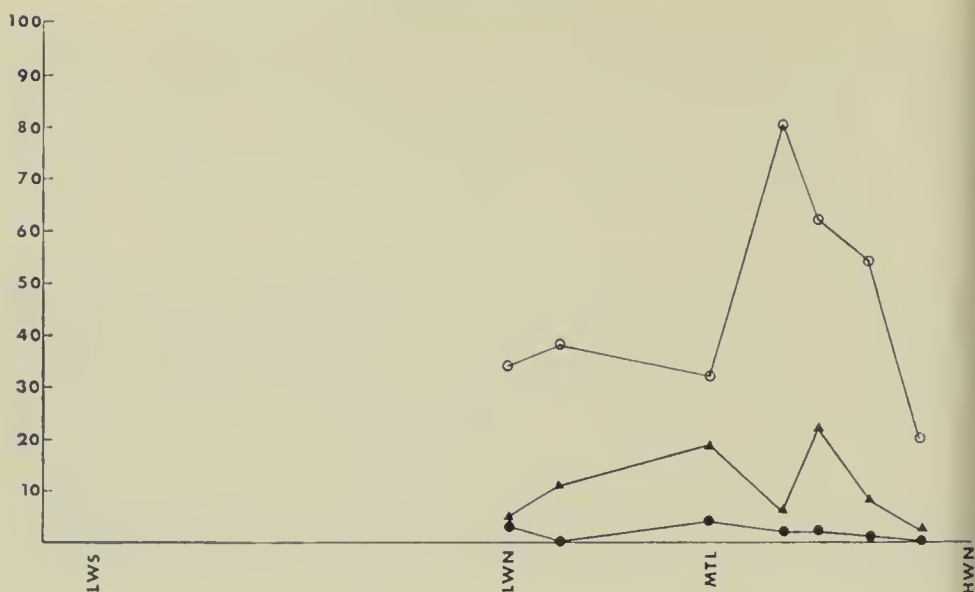


FIG. 4. Numbers of animals (● *Thais*, ○ *Littorina*, ▲ *Mytilus*) found in samples of five droppings from Purple Sandpipers *Calidris maritima* at each of seven levels of the main scar at Robin Hood's Bay, North Yorkshire, at neap tides. Abbreviations as in fig. 3

fragments of a further eight shells. No soft-bodied animals were found in the gizzard. During the study only two worms were seen to be picked up, both at Filey, and one of those was afterwards rejected. On the other occasion the Purple Sandpiper involved threw back its head and swallowed the worm in a series of gulps. This worm was tentatively identified through binoculars as *Eulalia viridis*, that being the only green polychaete that I have found on this shore. This behaviour was noted only on that one occasion, and it appears that worms are rarely taken by Purple Sandpipers.

By feeding at the water's edge and following the tide, Purple Sandpipers of necessity take prey species from different levels of the shore, and it follows that their diet reflects the zonation of the littoral fauna and flora. This can be seen in figs. 3 and 4, which show the numbers of the various prey species found in samples of five droppings from different levels of the shore. These do not of course indicate the food at those particular levels, owing to the unknown time taken for food to pass through the birds.

The numbers of *Thais* and *Littorina* at the different levels, presented in graphical form in fig. 3, were compared by the Spearman Rank Correlation Coefficient. This method gave a significant negative correlation coefficient, despite the smaller numbers of dogwhelks found in faeces at the lower end of the shore. It appears, therefore, that dogwhelks replace littorinids as the principal food lower down the

shore. The smaller numbers of dogwhelks perhaps indicate that, owing to the larger size of these animals, the birds are still obtaining sufficient food to fill their gizzards, whereas at higher levels of the shore more of the smaller littorinids are needed.

DISTRIBUTION OF DOGWHELKS AND WINKLES ON THE SHORE
Fig. 5 shows the densities of *Thais* and *Littorina spp.* at six levels up the main scar at Robin Hood's Bay, determined by taking four random quarter-metre quadrats at each level. The very small littorinids under 2 mm. (chiefly *L. saxatilis*), found among the barnacles and mussels, were sampled by five-centimetre quadrats. As far as possible, sampling stations were arranged at sites where faeces had been collected on the scar, but at low tide the birds had a far greater choice of feeding areas and wandered away from the scar. Thus fig. 5 does not necessarily represent the distribution of the gastropods over the whole of the feeding area of the Purple Sandpipers.

However, the similarity between figs. 3 and 5, of frequency of appearance in the faeces and distribution on the shore respectively,

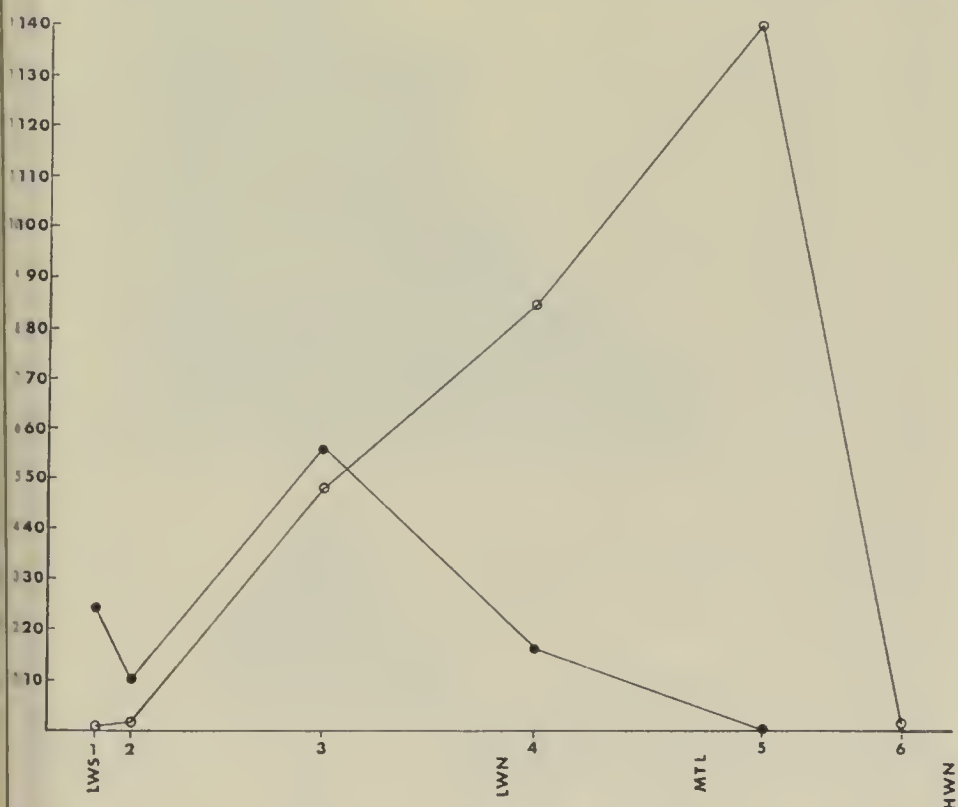


Fig. 5. Distribution of dogwhelks *Thais lapillus* (●) and winkles *Littorina spp.* (○) along a transect of six levels up the main scar at Robin Hood's Bay, North Yorkshire, the numbers of winkles having been divided by 100. Abbreviations as in fig. 3

Table 1. Proportions of winkles *Littorina* spp. to dogwhelks *Thais lapillus* in the diet of Purple Sandpipers *Calidris maritima* and on the shore at different levels of Robin Hood's Bay, North Yorkshire, mid-November 1965 to mid-January 1966

The levels, which begin with the lowest, are shown in fig. 5 and the ratios given are those of *Littorina* with *Thais* taken as unity. Level 2 is omitted because the position there was complicated by an unusual local abundance of *Hydrobia ventrosa*

Level	Diet ratio	Shore ratio
1	0.06	2.1
3	2.6	85.7
4	5.3	525
5	14.2	14,000
6	35.0	200

deserves comment. Table 1 shows the ratios of *Littorina* spp. to *Thais* in the diet and on the shore. It can be seen that this ratio in the diet is much smaller than that on the shore, and it therefore appears that Purple Sandpipers select dogwhelks. Nevertheless, it must be remembered that the vast majority of the littorinids found in the quadrats had a shell height of under 2 mm. (fig. 6) and most of these would not be taken by Purple Sandpipers. Without accurately knowing the sizes of littorinids and dogwhelks taken by Purple Sandpipers, it is therefore not possible to say definitely that they select one or the other. Amongst mussels, however, dogwhelks may be selected in preference to littorinids because their whitish shells make them conspicuous against the blue-black background of mussels.

At low water of neap tides the water receded only as far as the top of the mussel beds in this locality, and so the area available for feeding was considerably reduced. What is more, the area occupied by small dogwhelks was totally inaccessible and very few fragments of dogwhelk shells were found in the faeces. On the other hand, far greater numbers of mussels were taken during neap tides (fig. 4) than during spring tides (fig. 3). Purple Sandpipers are able, therefore, to resort to mussels when feeding conditions are not optimal. These may be taken in order to add to the diet a variety which at neap tides is not provided by other species of gastropods or by crabs.

SIZE DISTRIBUTIONS OF GASTROPODS

The dogwhelks and littorinids found in the quarter-metre quadrats mentioned above were brought back to the laboratory and measured with a calibrated low-power binocular microscope. At the time that the quadrats were sampled the larger specimens of dogwhelks and *Littorina littorea* were aggregated in crevices in the rocks, and did not

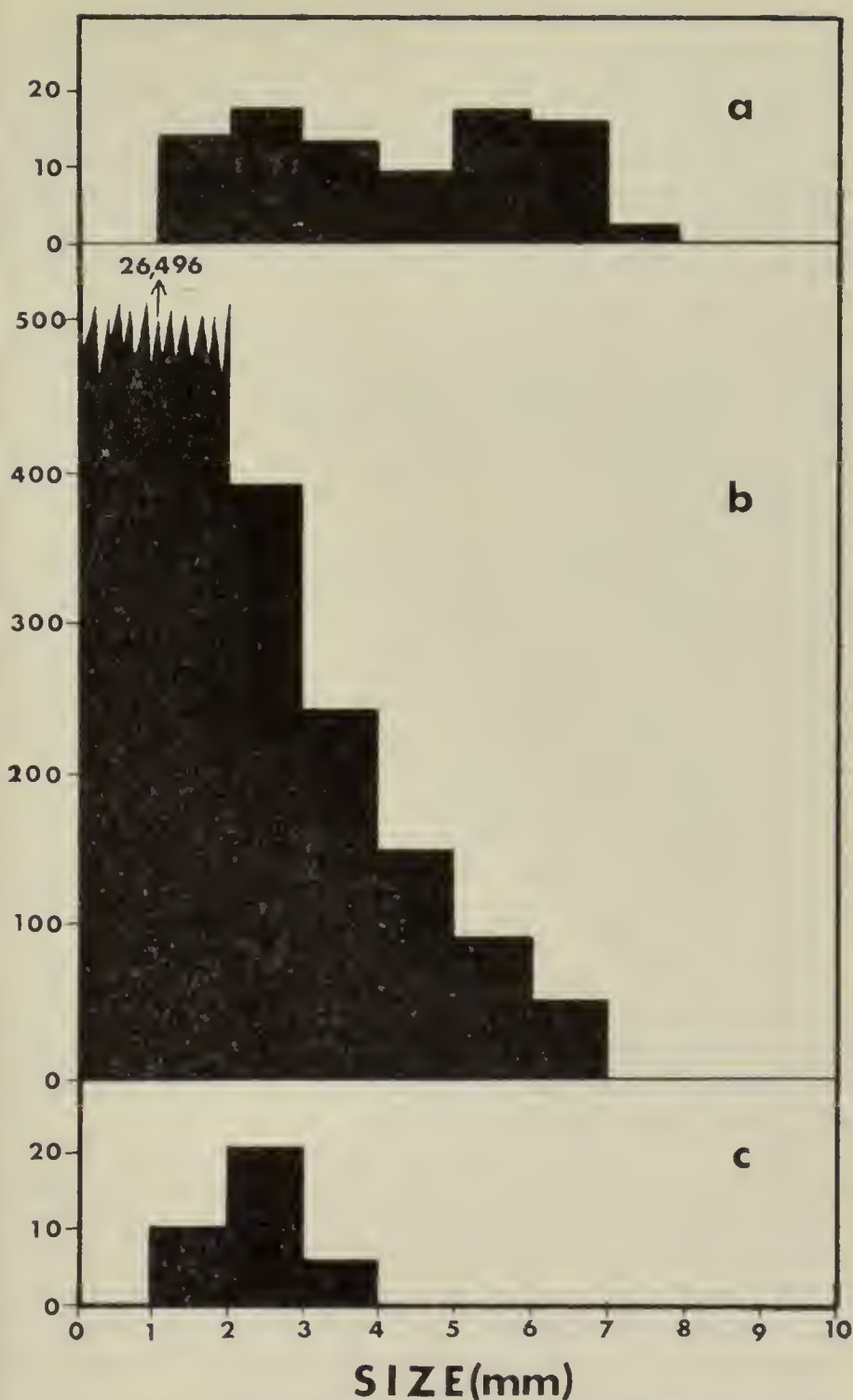


FIG. 6. Size frequency distributions of (a) dogwhelks *Thais lapillus* and (b) winkles *Littorina* spp. from six metre-square quadrats along a transect up the main scar at Robin Hood's Bay, North Yorkshire; and of (c) *Littorina* spp. in the gizzard of a Purple Sandpiper *Calidris maritima*

appear in the samples. The size distributions of the remaining small dogwhelks and littorinids are shown in fig. 6.

It was not found possible to determine the sizes of gastropods in the diet of the Purple Sandpipers from the fragments in the faeces, but by comparing these fragments with live specimens it was estimated that most of the dogwhelks eaten fell in the range of 4-7 mm. shell height. The method used by Gibb (1956) of comparing the sizes of opercula in the faeces with those of live animals was found to be inapplicable here. Few opercula of dogwhelks were found intact in the faeces and, in any case, the great variation in the shell proportions of dogwhelks even from areas only a few metres apart (Staiger 1957) rendered this method unreliable. Similarly, the presence of three species of *Littorina* on the shore, each having different shell proportions, invalidated any estimate of shell size for the group as a whole from the opercula present in the faeces.

The size range of the littorinids taken by the Purple Sandpipers thus had to be determined from the rather inadequate sample found in one gizzard (see fig. 6). The average size of these was 2.34 mm. This bird, however, had been feeding on the upper shore where the large numbers of very small *Littorina saxatilis* are found. In the faeces from this area the fragments of littorinids were generally of smaller shells than those in faeces collected elsewhere on the shore. Thus the average obtained from the gizzard sample may be somewhat lower than the true average size of the littorinids taken. This suggestion, although not backed by actual measurements, probably means that the average size of the littorinids eaten by Purple Sandpipers in Yorkshire is nearer to the figure of 2.72 mm. obtained by Gibb (1956) for this species in Cornwall.

The apparent bimodal distribution of dogwhelks on the shore must be mentioned. I have regularly sampled other areas of the shore for first-year dogwhelks, and in the larger samples have found a unimodal distribution. The bimodal distribution of size in fig. 6 may therefore be a consequence of the small sample.

It appears that, where possible, the Purple Sandpipers selected a particularly favourable size of prey. At the time of this study they were taking the larger specimens of the first-year group of dogwhelks. Personal observations have shown that these young whelks grow at the rate of approximately 1 mm. per month, so that by March the birds would presumably be feeding on the smaller members of this first-year group, assuming that the dogwhelks have a discrete breeding season, which at present appears to be the case in this area.

The Purple Sandpipers also selected a particular size range of littorinids (fig. 6), but where the larger and perhaps preferable sizes of winkles were comparatively scarce, on the upper levels of the shore

among the barnacles, they appeared to take smaller animals. To some extent, therefore, they were governed by what was available in this region.

If size is so important, why are larger size groups of dogwhelks selected than of littorinids? The answer may lie in the fact that littorinids have a fatter appearance than dogwhelks. If dogwhelks are orientated in the beak so that they are swallowed lengthways, shells of a greater height can be taken.

RATES OF FEEDING

Rates of feeding at three levels of the shore were obtained by measuring on a stop watch the time taken for individual Purple Sandpipers to pick up ten objects. The results are given in table 2, which shows that the rate of feeding was very much greater in the barnacle zone; this corresponds to an increased number of shells found in the faeces at this level. This increase was not great, however, and so the rate of defaecation must have increased, but no data were obtained for this.

The slackening in the rates of feeding lower down the shore and in the *Fucus* may result from two factors: (a) the density of the prey here is much less than amongst the barnacles, so that the birds may have to spend more time searching for food; and (b) the gastropods at the lower and higher levels of the shore are larger than those at the mid-shore level. This is particularly the case low down where dogwhelks are the principal food. Here these large shells soon filling the gizzard may contribute to the lower rate of feeding.

At dusk the feeding rate is considerably lower than at other times of the day. This is due to the birds' preoccupation with chasing and preening (mentioned under FEEDING ROUTINE on page 168).

Table 2. Time taken by individual Purple Sandpipers *Calidris maritima* to pick up ten objects on different levels of the shore at Robin Hood's Bay, North Yorkshire, and the number of objects found in the faeces at three of these levels

Level of shore	Time taken (seconds)	Average (seconds)	Number of objects in faeces
High (bladder wrack)	64, 49, 39, 60, 81, 63, 38, 88, 46, 45, 48	55	14
Mid (barnacles)	15, 16, 19, 17, 17, 18, 21, 18, 17, 15, 15	17	18
Low (mussels)	81, 43, 76, 52, 68, 67, 55, 63, 77	58	9
Sandy beach at dusk	45, 40, 86, 98, 124	79	—

OBSERVED EFFECTS OF PHYSICAL FACTORS ON FEEDING
Feeding near the water's edge frequently requires evasive action from waves and is therefore greatly influenced by weather and sea conditions. The Purple Sandpipers were watched during calm and rough seas and the frequency with which the whole flock had to fly or run out of the way of a wave was measured over hourly watches. On 23rd November 1965, a calm day, the average frequency of disturbance over three hour-long watches was six times per hour. On the other hand, similar watches on 1st December 1965, during rough seas, gave an average of 28 disturbances per hour. The average duration of these disturbances, timed with a stop watch, was 17.2 seconds. This means that on a calm day 1.7 minutes per hour were spent evading waves, whereas on a rough day 8.0 minutes were lost in this way. Thus almost five times as much time has to be devoted to wave evasion in stormy conditions as on calm days. On a December day, when the tide normally leaves the shore uncovered for only six daylight hours, storms and onshore winds may hold the tide in for a further half-an-hour or more, and a further 48 minutes are lost evading waves. This means that the normal six hours of feeding time are reduced by about a quarter.

The effect of the weather was even more pronounced on Filey Brig, where the diet normally consists of dogwhelks. During rough seas, however, the Purple Sandpipers are driven to the sheltered side of the Brig along the northern edge of Filey Bay, and the emphasis changes from dogwhelks to the small crabs which are there abundant amongst the small mussels and sand.

The other physical factor influencing feeding is of course the state of the tide, be it high or low, spring or neap, as this not only determines the diet at any moment, but also governs the extent of feeding area available. At low water spring tides there is a long water-line in Robin Hood's Bay where the Purple Sandpipers can feed, but approaching high water at every tide they are driven on to the narrow *Fucus* belt at the top of the main scar and during the winter this area must suffer particularly intense predation from them.

STRUCTURE OF THE BILL AND GIZZARD

The bill of the Purple Sandpiper that was shot was examined (fig. 7). It was short and sturdy, and slightly downcurved. Inside the upper mandible was a flexible membrane bearing pointed, backwardly-projecting teeth. Proximally there were two outer rows of large teeth and a central row of smaller teeth. More distally the rows of teeth joined until these became a single row of small teeth down the centre of the upper mandible. The distal part of the upper mandible was extremely flexible and of a rubbery nature.

The bill thus seems incapable of chewing, but is ideally adapted for

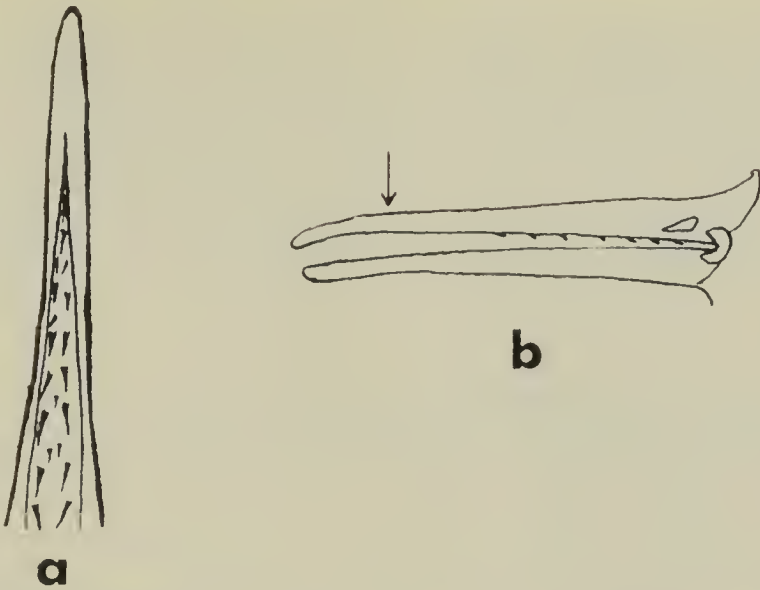


FIG. 7. Bill of Purple Sandpiper *Calidris maritima*: (a) inside of upper mandible showing rows of teeth; (b) side view showing decurvature and point of flexure on the upper mandible (marked by arrow)

grasping prey. When a Purple Sandpiper located a snail, it was seen to hold it in the tip of the bill and then throw it back up the bill until it could be swallowed. This process would doubtless be helped by the teeth, but it is thought that these may have evolved more in conjunction with its summer feeding habits when vegetable matter forms the main component of the diet (Witherby *et al.* 1938-41).

The bill modifications preclude the use of the bill for cracking shells, a process performed by the gizzard. In the gizzard of the specimen obtained, the proximal part contained unbroken shells, whereas shells further back were chipped to varying degrees and at the distal end of the gizzard only shell fragments were found. The walls of the gizzard were very thick and muscular and were lined by teeth. Small stones were found in the gizzard, and these doubtless add to the efficiency of this organ as a grinding centre.

IS THE PURPLE SANDPIPER A LITTORAL ORGANISM IN WINTER? During the winter the Purple Sandpiper is strictly coastal (Witherby *et al.* 1938-41). It is generally found only on rocky shores and its diet consists entirely of organisms found within the littoral zone. It does not restrict itself to one prey species, but by following the tide up and down it encounters different species of potential prey owing to the zonation of these species on the shore.

The type of food and rate of feeding are governed by the state of the

tide, by the degree of shelter or exposure of the shore, and by the weather. The feeding routine is determined by the tide and by the amount of daylight. Purple Sandpipers are thus subjected to both diurnal and tidal rhythms of behaviour. That they do not apparently feed at night suggests that prey location is entirely visual.

One may ask why Purple Sandpipers have such a local distribution on the Yorkshire coast. The answer to this may lie in the availability of stony resting areas which remain uncovered by the highest spring tides. Both Robin Hood's Bay and Filey possess such areas, but the majority of the shores in the Robin Hood's Bay area do not.

Gibb (1956) calculated that one Rock Pipit may take as many as 14,300 littorinids in a day. By taking an average of the feeding rates obtained in the present study and estimating that a Purple Sandpiper spends $5\frac{1}{2}$ hours feeding during a December day, it can be calculated that one Purple Sandpiper may take in the region of 4,600 snails per day. This figure is only a rough approximation, but it means that a flock of 40 would probably take in excess of 11,500,000 gastropods during a two-month stay in Robin Hood's Bay. These are taken from a restricted size range of snails, with the result that this considerable predation must impose tremendous selection pressures on species like *Thais lapillus* and *Littorina saxatilis* which have non-pelagic larvae and exist in more or less morphologically distinct populations in Robin Hood's Bay.

Purple Sandpipers are thus subjected to many of the factors which are believed to affect animals inhabiting the littoral zone, and they must play a considerable rôle in the dynamics of littoral gastropod populations. During the winter months, therefore, Purple Sandpipers are integral units of the littoral fauna.

ACKNOWLEDGEMENTS

I am indebted to Dr. E. Broadhead, of the Department of Zoology, Leeds University, and to Dr. J. R. Lewis, of the Wellcome Marine Laboratory, Robin Hood's Bay, for useful discussion, and to Dr. Lewis for reading the manuscript.

This work was carried out during the tenure of a grant from the Scientific Research Council.

SUMMARY

The winter food and feeding habits of a flock of 39 Purple Sandpipers *Calidris maritima* at Robin Hood's Bay, North Yorkshire, from mid-November 1965 to mid-January 1966 are described with supplementary observations on another flock of similar size on Filey Brig, East Yorkshire. The composition of the diet of these birds was determined by analysing faeces; owing to the nature of the food this was considered to be a reliable indicator of what they were eating. The feeding routine involved both diurnal and tidal rhythms of behaviour.

WINTER FEEDING OF PURPLE SANDPIPER

The principal food organisms were small winkles *Littorina spp.* and first-year dogwhelks *Thais lapillus*; small mussels *Mytilus edulis* and crabs *Carcinus maenas* were important reserve foods. The presence of winkles and dogwhelks in the faeces is related to the distribution of those organisms on the shore. The Purple Sandpipers took only a restricted size range of each prey species. Their bill and gizzard adaptations are described.

It is concluded that Purple Sandpipers form an integral part of the littoral fauna of Robin Hood's Bay during the winter, and probable reasons for their local distribution are given.

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The bird population succession at Newborough Warren

By *P. Hope Jones*

The Nature Conservancy

INTRODUCTION

NEWBOROUGH WARREN is a sand-dune system of some 3,000 acres (about 1,200 hectares) situated on the south-west coast of Anglesey. Half of the area has been declared a National Nature Reserve, while the other half is a state forest. Apart from a narrow rock outcrop running north-east to south-west, blown sand blankets the area in a series of ridges and hollows. The vegetation, sparse and of few species on the seaward dunes, increases in cover and floristic diversity to landward; a full account of the plant succession has been given by Ranwell (1959, 1960). During the compilation of a check-list of bird species for the Warren, it became apparent that one of the greatest deficiencies in knowledge was the absence of precise information on the composition and density of species in the different stages of tree growth. Between the autumn of 1962 and the summer of 1964, therefore, the winter and breeding bird populations were sampled by means of transects and quadrats respectively. This study also gave valuable insight into the changes in the avifauna resulting from the afforestation of part of the sand-dune system.

Since 1947, the Forestry Commission have been progressively afforesting the north-western half of the Warren, and plantations of every age from the newly-planted to the newly-thinned (or pole) stages were present in 1964. The plantations were almost entirely coniferous and mainly comprised stands of Corsican pine *Pinus nigra* var. *calabrica*. Changes in bird life associated with afforestation have been studied by Lack (1939), by Lack and Lack (1951), and by Yapp (1962) among others; most of the data presented by these authors were collected by means of transect counts, and were concerned more with changes in species composition and relative abundance than with absolute density. The object of the present study was to determine as accurately as possible the density and distribution of the breeding birds present in the various habitats sampled, and to collect comparative data on the birds present there in winter.

The breeding population

METHODS OF STUDY AND SOURCES OF ERROR

Six communities were chosen to represent the transition from mobile

and dunes to the oldest pine plantation: I, mobile and semi-mobile sand dunes (termed 'dunes' from here onward); II, stable dune grassland (termed 'grassland'); III, the establishment stage of newly-planted pines; IV, the early thicket stage; V, the late thicket stage; and VI, the early pole stage of the developing plantations (more detailed descriptions of the habitat types sampled by the six quadrats have been listed in appendix 1 on page 189). Representative areas of each of these six categories were selected and a quadrat of about 22 acres (8.9 hectares) was marked out in every case. Homogeneous areas were favoured and quadrats were located in the centre of these areas to avoid, as far as possible, any major edge effect. Conditions for the growth of pines at Newborough are rigorous, and the average heights of the trees in the different plots were taken to provide a better indication than age of their significance as bird habitats.

One accepted unit in measuring a breeding population of passerines is the singing male. At Newborough, the location of each singing bird in each quadrat was recorded on a map, so that after several visits it was possible to plot 'species maps' and thus obtain a figure for the total song-bird population of every quadrat; for descriptions and critiques of this method see Enemar (1959) and Williamson (1964). Enemar worked out that 50%-70% of the males in his study area were recorded at each visit, but basically his area was covered by only one belt-transect at each count; this percentage was doubtless exceeded at Newborough since every quadrat was traversed five times in the course of each main visit. Non-passerine species were more difficult to count, but the frequency of visits probably resulted in most breeding pairs being recorded.

Six major mapping censuses of each quadrat were made at approximately fortnightly intervals between March and May 1964. Four of the six quadrats were censused during the same period in 1963 and, since ornithological and other work had been taking place near them for three seasons, the general picture was already fairly well known. Census-taking was standardised as far as possible by confining major counts to the early mornings and choosing days when there was little or no wind or cloud. All birds seen or heard were recorded and their locations plotted. The breeding populations as finally assessed from the mapping technique were confirmed by numerous shorter visits and observations between early March and late July. In cases of birds with song posts both in the study area and outside it, the territory was included in the final total if most of the occasions of recording were inside the plot.

All four forest plots had rides running through them and these, together with the edges of the blocks of trees, provided an edge effect which may possibly have been favoured by certain species (though this

BRITISH BIRDS

Table 1. Numbers of pairs of breeding birds in six habitat types at Newborough Warren, Anglesey, in 1963 and 1964

Quadrat number	Habitat stage	Area (acres)	Average tree height (feet)	Total pairs of birds		Pairs per 100 acres 1964
				1963	1964	
I	Mobile dunes	21.0	—	?	4	19
II	Grassland	21.0	—	?	10	48
III	Establishment	21.3	3	5	4	19
IV	Early thicket	23.4	8	8	11	47
V	Late thicket	20.8	12	20	21	101
VI	Early pole	22.4	19	24	29	129

Table 2. Numbers of pairs of each species breeding in the six quadrats at Newborough Warren, Anglesey, in 1964

Scientific names of birds are all listed in appendix 2 on page 190

Species	Quadrat number and habitat stage					
	I Mobile dunes	II Grassland	III Establishment	IV Early thicket	V Late thicket	VI Early pole
<i>Open country birds</i>						
Shelduck	1					
Curlew	1	1	1			
Skylark	1	6	3			
Partridge		1				
<i>Thicket stage birds</i>						
Reed Bunting	1	1		4	2	1
Yellowhammer				1	2	
Redpoll				2	4	1
Willow Warbler				2	4	4
<i>Early pole stage birds</i>						
Goldcrest				1	2	3
Pheasant					1	1
Robin					2	2
Chaffinch					1	4
Woodpigeon					2	5
Coal Tit						1
Wren						4
Chiffchaff						1
<i>Ubiquitous</i>						
Mallard		1		1	1	2
Total pairs	4	10	4	11	21	29
Passerine pairs	2	7	3	10	17	21

was not evident). However, since these rides and edges are characteristic of the entire forest at Newborough, any species attracted by such edge areas can be said to be characteristic of the forest generally.

CENSUS RESULTS

Table 1 gives the calculated stationary population of each quadrat, while species details for 1964 are shown in table 2.

The distribution of other species regarded, on the experience of five summers, as part of the breeding strength of the Warren, though not recorded as nesting in the sampling quadrats, is shown in table 3. Although this table lists a good number of species, each was represented, apart from the gulls, by very few individuals. Before the 1962/63 winter Lapwings nested regularly in the damper, flatter areas of stable dune grassland and, to a lesser extent, among the small trees. The lapwing breeding population of the whole Warren was reduced to one pair in 1963 and had not recovered sufficiently by 1964 for this species to be present in any quadrat.

The changes in bird life resulting from afforestation were pronounced, and most breeding species were more or less restricted to certain stages of the transition from dunes to pole-stage forest. From general observation, only the Reed Bunting and the Mallard were known to breed in every major habitat on the Warren, although the former was distinctly commonest in the thicket stage; the Mallard bred in most areas where there were pools or ditches.

The overall pattern of the succession shows that numbers of birds per quadrat dropped in the early stages of pine 'colonisation', but subsequently rose to their previous level and then surpassed it as the trees grew in height. This type of pattern has been noted in other studies; in particular, Johnston and Odum (1956) found in Georgia that the trend towards increased bird density, in the succession from bare ground to late sub-climax pine and oak-hickory, was interrupted by low densities encountered in young pine forests. Lack's (1939) estimated densities of 77 adult passerines per 100 acres of Breckland heath changing to about 180 per 100 acres of 26-years-old Scots pine (*Pinus sylvestris*) plantation can be compared with the Newborough figures of 20 adult passerines per 100 acres of duneland changing to about 200 per 100 acres of 17-years-old Corsican pine plantation. In the very abrupt, and artificial, ecological change-over at the edge of the plantations, a situation does not arise such as that found by Martin (1960) in Ontario where plots of mixed forest border had larger populations of birds than those inside the forest proper.

The winter population

METHODS OF STUDY

Estimating the population density on the Warren in winter is very

BRITISH BIRDS

Table 3. Habitat distribution of species known to breed (or suspected of breeding) on Newborough Warren, Anglesey, but not recorded as part of the stationary population in the 1964 quadrats

Species	Mobile dunes	Grass- land	Habitat stage			
			Estab- lishment	Early thicket	Late thicket	Early pole
Great Black-backed Gull	*					
Lesser Black-backed Gull	*					
Herring Gull	*					
Meadow Pipit	*	*				
Canada Goose	*	*	*			
Oystercatcher	*	*	*			
Lapwing		*	*			
Redshank		*	*			
Stonechat		*	*			
Whinchat		*	*	*		
Short-eared Owl		*	*	*		
Cuckoo			*	*		
Grasshopper Warbler			*	*		
Linnet			*	*		
Song Thrush				*	*	
Duncock				*	*	
Whitethroat				*	*	*
Blackbird					*	
Carrion Crow					*	*
Magpie					*	*
Mistle Thrush						*
Bullfinch						*

difficult compared with the breeding season because the birds present are much more mobile and not so restricted to set localities; they are also less conspicuous, in that most do not sing throughout the winter and the calls which they do produce are often audible over smaller distances than are their spring songs. Estimates of population density by means of counts in set quadrats could not therefore be used for the winter population, so a system of study by belt-transects was instituted. These transects sampled the population rather than counted it, however, and allowed comparison one with another instead of providing a basis for calculation of the actual numbers of birds present. All the work was done during the course of the four months November, December, January and February—a period which was thought to be relatively free from such large movements of birds as occurred during the spring and autumn migrations through the area.

Each 20-minute transect, about 500 metres long, was carried out once

in the first half and once in the second half of each month, giving a total recording time for each transect of 40 minutes per month and 160 minutes over the course of the winter. Conditions were standardised as far as possible by recording in mid and late morning, and in calm, dry conditions. All birds were recorded which were heard or seen within an estimated 50-60 metres either side of the line walked by the observer; those flying overhead were included only if they came down into, or rose from, the prescribed area.

TRANSECT RESULTS

The following four habitats were sampled: unplanted mobile and semi-mobile dunes (corresponding to breeding quadrat I); unplanted stable dune grassland (corresponding to breeding quadrat II); afforested duneland (corresponding to breeding quadrat IV); and afforested grassland (corresponding to breeding quadrat V). The results of transect counts through these areas have been set out in table 4 and, although the actual numbers recorded are low, they do give a useful impression of the winter communities found in the different habitats.

Relatively little difference was noted between the unplanted areas of dunes and the stable grassland: five species were common to both (39%), four were recorded only on the duneland and another four were recorded only on the grassland. As the trees advanced in growth, so the difference in species composition of the developing area became more marked. The early thicket stage shared with the original unplanted habitat only 23% of the bird species recorded for both areas; with the trees in the late thicket stage, the proportion fell to 12%.

The actual numbers of individuals recorded were rather low in all cases except that of the older plantation; it would seem that birds on this dune system were relatively thinly-distributed during the four winter months considered, and comprised but few species. There was not much to choose between the totals for the unplanted dunes and for the young trees, but once the plantations were well into the thicket stage the bird numbers rose appreciably. This increase in numbers of both species and individuals was caused almost entirely by the substitution of different species for those found on the original duneland habitat; as the average tree heights rose, so the diversity of bird species and the number of individuals increased towards a peak which did not appear to have been reached in the areas of the succession studied. Counts by Lack and Lack (1951) indicated a gradual increase in the winter bird population with increasing age of Scots and Corsican pine in Breckland plantations. In unbrushed Scots pine, in January 1949, these authors obtained a count of 35 birds per hour. The figures for the Newborough unbrushed Corsican pine plantation were 90 contacts

BRITISH BIRDS

Table 4. Total numbers of birds recorded in four zones of the dunes and pine plantations at Newborough Warren, Anglesey, in 160 minutes of transect time during November 1962 to February 1963

Figures in brackets indicate the frequency of recording, i.e. the number of transects up to the maximum of eight on which each species was recorded. Crossbills are not a usual feature of the area; the ones included here were due to the presence of unusually large numbers in Britain and Ireland during the sampling period (Davis 1964)

Species	Mobile dunes	Habitat stage		
		Grass-land	Early thicket	Late thicket
Curlew	2 (1)			
Meadow Pipit	4 (3)	3 (3)		
Raven	3 (2)	2 (1)		
Partridge	6 (1)	6 (2)		
Skylark	1 (1)	12 (3)		
Carriion Crow		5 (2)		
Hen Harrier		1 (1)		
Reed Bunting	6 (4)	5 (2)	5 (2)	10 (6)
Wren	4 (3)		9 (6)	8 (4)
Redwing	2 (1)		2 (1)	2 (1)
Fieldfare	1 (1)			1 (1)
Mistle Thrush		4 (1)		4 (2)
Song Thrush		1 (1)	4 (3)	3 (3)
Short-eared Owl			1 (1)	
Goldcrest			5 (4)	15 (7)
Linnet			2 (1)	2 (1)
Crossbill				25 (5)
Coal Tit				5 (3)
Bullfinch				5 (3)
Redpoll				5 (2)
Yellowhammer				5 (2)
Magpie				4 (3)
Woodpigeon				3 (3)
Great Tit				3 (2)
Chaffinch				2 (2)
Green Woodpecker				1 (1)
Totals	29	35	28	103

per hour in the hard-weather January of 1963 and 27 per hour in the mild-weather January of 1964, making it evident that factors other than those of tree age or height can also affect the counts to an appreciable extent.

CHANGES IN WINTER NUMBERS

The 1962/63 winter was notable for a period of extremely hard weather in January and February, and so the same transect counts were repeated during the 1963/64 winter which, by contrast, was very mild. The



LATE 27. Barn Owl *Tyto alba* squeezing from nest, Norfolk, April 1964 (*H. A. Hems*)
(pages 190-192)



PLATE 28. Lesser Black-backed Gulls *Larus fuscus* fighting, Ayrshire, June 1965; note how close one bird's upper mandible is to the other's eye (William S. Paton)





LATE 29A. Ruff *Philomachus pugnax* displaying, Denmark, May 1965 (D. A. P. Cooke)

LATE 29B. Great Skuas *Stercorarius skua*, Shetland, June 1964 (J. Edelsten)





PLATE 30A. Black Guillemot *Cepphus grylle*, Shetland, June 1964 (Sidney J. Clarke)

PLATE 30B. Common Gull *Larus canus* on nest, Sutherland, June 1965 (K. J. Carlson)

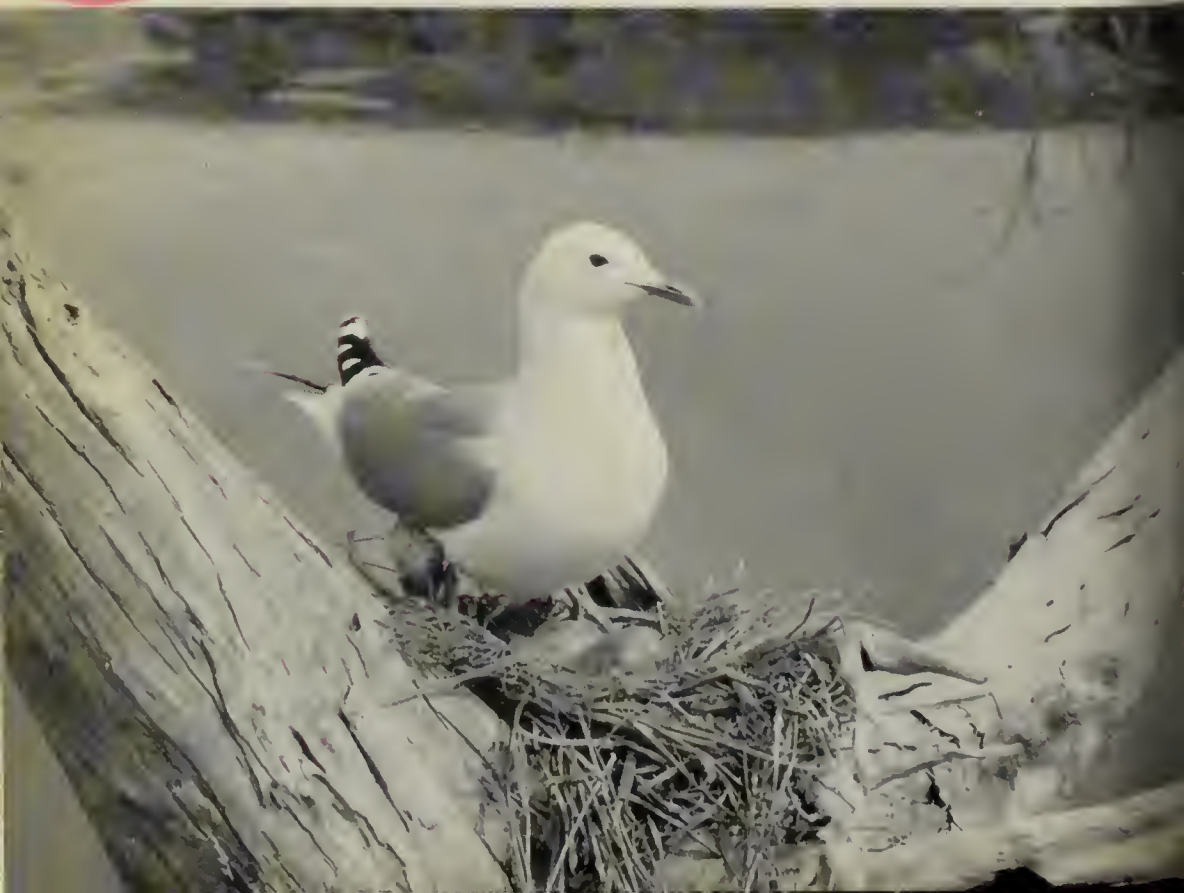




PLATE 31A. Snipe *Gallinago gallinago*, Argyll, June 1965 (J. B. and S. Bottomley)

PLATE 31B. Avocet *Recurvirostra avosetta*, Suffolk, June 1965 (E. K. Thompson)







PLATE 33A. Red-backed Shrike *Lanius collurio*, Surrey, July 1965 (D. M. T. Ettlinger)

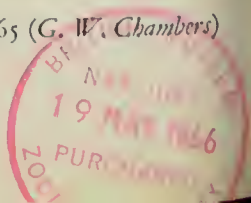
Wren *Troglodytes troglodytes*, Lincolnshire, June 1955 (Harold Auger)

PLATE 33B. Cattle Egret *Bubulcus ibis* on nest, Portugal, May 1964 (A. N. H. Peach)





PLATE 34. Short-eared Owl *Asio flammeus*, Co. Durham, May 1965 (G. W. Chambers)



BIRD POPULATION AT NEWBOROUGH WARREN

Table 5. Total numbers of birds recorded at Newborough Warren, Anglesey, in 160 minutes of transect time during each of the contrasting winters of 1962/63 (hard weather) and 1963/64 (mild weather)

Habitat	Winter 1962/63		Winter 1963/64	
	Birds	Species	Birds	Species
Mobile dunes	29	9	2	2
Grassland	35	9	5	2
Early thicket	28	7	15	4
Late thicket	103	18	61	13

Trend in proportion of species was much the same as in the previous year, but the numbers involved were reduced considerably (table 5). It is interesting to note that the numbers of birds on the dunes and grassland were reduced by 93% and 85% respectively, whereas the numbers in the plantations were down by only 46% and 35% for the early and late thicket stages.

The number of birds present on Newborough Warren in winter varies considerably from one year to another, and qualitative assessments indicate that the level of the 'winter population' fluctuates much more violently than does that of the summer stock. This is due primarily to the varying severity of the winters: in hard seasons, such as that of 1962/63, many birds are forced to flee westwards and they turn up in good numbers in Anglesey, whereas in mild winters, such as that of 1963/64, there is no immigration on so great a scale. The known heavy mortality in the hard season may thus have had only a subsidiary effect in depressing the numbers recorded on the following winter's transects, but there is evidence that some combination of both factors was responsible. In general, birds arrive in Anglesey whenever there is a spell of hard winter weather in northern England, so that the numbers on the Warren at any one time may reflect not so much the winter value of the habitat as the state of the weather elsewhere.

Numbers fall, often quite considerably, over the course of a winter and at this season there is probably no such thing as an absolute density comparable to that which can be ascribed to a breeding population. Again the severity of the winter will affect the numbers present; it has been shown for Newborough (Jones in press) that the numbers present in a plantation of Corsican pine 17 to 18 years old fell by 76% and 44% (of the November population) during the severe 1962/63 winter and the mild 1963/64 one respectively. This was apparently due to a combination of mortality and exodus. For several reasons then, and not least the unreliability of censusing at this season, it is extremely difficult to calculate the absolute numbers of birds per unit

area which are supported in winter by the various habitats at Newborough.

ACKNOWLEDGEMENTS

I am grateful to the Forestry Commission staff at Newborough for their co-operation and help in many ways during the period of field work undertaken in Newborough Forest. Helpful suggestions on improving the contents of early drafts of this paper were made by Dr. R. J. Elliott and R. Goodier (Nature Conservancy, Wales), Dr. I. Newton (Edward Grey Institute), Dr. T. B. Reynoldson (University College of North Wales, Bangor), and Kenneth Williamson (B.T.O., Tring); to these I am greatly indebted.

SUMMARY

The breeding and wintering populations of birds in six major habitats on Newborough Warren, Anglesey, were sampled during the period 1962 to 1964. The main aims of the work were to obtain data on species composition, distribution and abundance, and on the change in bird life following afforestation of the duneland.

Six quadrats were set up to sample the bird succession from mobile dunes through stable grassland and through four stages in the development of Corsican pines. Dominant breeding species at the dune stage were Skylark *Alauda arvensis* and Curlew *Numenius arquata*; at the thicket stage, Willow Warbler *Phylloscopus trochilus*, Redpoll *Acanthis flammea* and Reed Bunting *Emberiza schoeniclus*; and in the early pole stage, Woodpigeon *Columba palumbus* and Chaffinch *Fringilla coelebs*. The passerine breeding density was about 20 birds per 100 acres (50 per square kilometre) on the duneland, rising to about 200 birds per 100 acres (494 per square kilometre) in the oldest pine plantations (17 years old, 19 feet high); the increase was not continuous because at the tree establishment stage the change-over from open-land to thicket species was accompanied by low bird density.

Winter transects were run through areas of open (unplanted) and afforested duneland. In 160 minutes of transect time over the 1962/63 winter the following numbers of birds were recorded (numbers of species in brackets): mobile dunes 29 (nine), stable dune grassland 35 (nine), pines in early thicket stage 28 (seven), and pines in late thicket stage 103 (18). Commonest species on the open dunes were Skylark, Partridge *Perdix perdix* and Meadow Pipit *Anthus pratensis*; in the trees, Goldcrest *Regulus regulus*, Wren *Troglodytes troglodytes* and Reed Bunting. During the milder 1963/64 winter, the trend in proportion of species was similar, but the numbers of birds were lower by 89% on the duneland and by 40% on the tree-covered areas.

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Appendix I. Habitat descriptions for the sample quadrats

I. Dunes. An area of shifting and unstable sand with an open community of marram grass *Ammophila arenaria* on the hills and creeping willow *Salix repens* in the hollows (or dune 'slacks'); this vegetation covered about half, the rest being bare sand.

II. Grassland. A flatter area with complete vegetation cover consisting mainly of grasses such as *Festuca rubra*, *Anthoxanthum odoratum* and *Agrostis tenuis*. Even in this late stage in the botanical succession, marram and creeping willow persisted, though in senescent condition, on low mounds and in damp hollows respectively. Cover at ground level was very dense, since the area had not been appreciably grazed by domestic stock or Rabbits *Oryctolagus cuniculus* for several years.

III. Tree establishment stage. A flattish area of stabilised small dunes and dune slacks whose low vegetation was dominated by various grasses, as well as marram and creeping willow. Planting of Corsican pines *Pinus nigra* var. *calabrica*, with a patch of Jeffrey's pines *P. jeffreyi*, was carried out in 1957, and by the spring of 1964 these trees averaged three feet in height, having been planted five feet apart.

IV. Early thicket stage. Again the low vegetation of this slightly sloping area was marram and creeping willow, but these were being suppressed as the tree canopy closed. The dense Corsican pines, with a scattering of lodgepole pines *P. contorta*, were planted in 1954, and had an average height of eight feet in 1964, the trees again being five feet apart.

V. Late thicket stage. Planted in 1952 with the same five-foot spacing, and by 1964 averaging twelve feet in height, the trees of this plantation were very densely packed and in many places had suppressed most of the ground vegetation, though, where the canopy had not closed completely, remnants of the dune grassland flora survived. A few white spruces *Picea glauca* and scattered lodgepole pines were present among the Corsican pines.

VI. Early pole stage. The oldest plantation in the forest. The Corsican pines of this block were 17 years old, and averaged 19 feet in height, with the usual five-foot spacing between trees. Except under occasional gaps in the canopy, all the grassy ground vegetation had disappeared and the plantation floor was covered by a carpet of needles. Some trees had been brashed to a height of six or seven feet and the sawn-off lower branches had been left on the ground.

Appendix 2. Scientific names of bird species in tables and text

Mallard <i>Anas platyrhynchos</i>	Wren <i>Troglodytes troglodytes</i>
Shelduck <i>Tadorna tadorna</i>	Mistle Thrush <i>Turdus viscivorus</i>
Canada Goose <i>Branta canadensis</i>	Fieldfare <i>Turdus pilaris</i>
Hen Harrier <i>Circus cyaneus</i>	Song Thrush <i>Turdus philomelos</i>
Partridge <i>Perdix perdix</i>	Redwing <i>Turdus iliacus</i>
Pheasant <i>Phasianus colchicus</i>	Blackbird <i>Turdus merula</i>
Oystercatcher <i>Haematopus ostralegus</i>	Stonechat <i>Saxicola torquata</i>
Lapwing <i>Vanellus vanellus</i>	Whinchat <i>Saxicola rubetra</i>
Curlew <i>Numenius arquata</i>	Robin <i>Erithacus rubecula</i>
Redshank <i>Tringa totanus</i>	Grasshopper Warbler <i>Locustella naevia</i>
Great Black-backed Gull <i>Larus marinus</i>	Whitethroat <i>Sylvia communis</i>
Lesser Black-backed Gull <i>Larus fuscus</i>	Willow Warbler <i>Phylloscopus trochilus</i>
Herring Gull <i>Larus argentatus</i>	Chiffchaff <i>Phylloscopus collybita</i>
Woodpigeon <i>Columba palumbus</i>	Goldcrest <i>Regulus regulus</i>
Cuckoo <i>Cuculus canorus</i>	Duncock <i>Prunella modularis</i>
Short-eared Owl <i>Asio flammeus</i>	Meadow Pipit <i>Anthus pratensis</i>
Green Woodpecker <i>Picus viridis</i>	Linnet <i>Acanthis cannabina</i>
Skylark <i>Alauda arvensis</i>	Redpoll <i>Acanthis flammea</i>
Raven <i>Corvus corax</i>	Bullfinch <i>Pyrrhula pyrrhula</i>
Carriion Crow <i>Corvus corone</i>	Crossbill <i>Loxia curvirostra</i>
Magpie <i>Pica pica</i>	Chaffinch <i>Fringilla coelebs</i>
Great Tit <i>Parus major</i>	Yellowhammer <i>Emberiza citrinella</i>
Coal Tit <i>Parus ater</i>	Reed Bunting <i>Emberiza schoeniclus</i>

More examples of the best recent work by British bird-photographers

(Plates 27-34)

THIS IS THE SEVENTH annual selection of the best contemporary work by British bird-photographers. As always, the choice has been difficult, but once again, other things being equal, some preference has been given to photographs of species which have not previously appeared in the series and also to ones by new or less well-known photographers.

The photographic process as we know it today is unfortunately not permanent and sooner or later both negatives and prints start to fade. This may well take 50 or even 100 years, depending on how well the negatives or prints have been stored, but the day inevitably comes when the image begins to disappear. This is one of our main reasons for publishing these annual selections of photographs as there is no reason why a reproduction should not last indefinitely, even if it lacks some of the detail and delicacy of the original print. Another reason

as that many bird-photographers are satisfied by the actual photography and the resulting pictures, without being particularly interested in publication. Thus, were it not for this series, many of these photographs would probably never be seen by the readers of *British Birds*.

As in previous years, we have made our selection mainly from the photographs circulated in the folios of the Zoological Photographic Club, the Nature Photographers Society and the Nature Photographers' Portfolio Society, and we are grateful to the members concerned for the help they have given. Most of the leading bird-photographers belong to one or more of these organisations, but we also keep a careful watch on the illustrations appearing in newspapers and magazines. Even so, there must be many new photographs which we never have the pleasure of seeing. We therefore urge readers either to notify us of any which they think might be suitable for inclusion in future selections or to ask the photographers concerned not to hesitate to send in prints. Now that the series has been running for seven years, more and more prints are being submitted, but there may still be people who are too diffident to supply photographs on their own initiative.

We believe that the present selection is well up to the standard and variety of the previous ones, including as it does both interesting action and superb portraiture. It starts and finishes with owls: what an outstanding picture the Barn Owl *Tyto alba* by H. A. Hems (plate 27) makes as it uses its wing to lever itself out of an unusually small nest-entrance; and notice how the square outline of the hide is reflected in the glaring eyes of the Short-eared Owl *Asio flammeus* by G. W. Chambers (plate 34). Action is shown in William S. Paton's two shots of Lesser Black-backed Gulls *Larus fuscus* fighting (plate 28); it is remarkable that eyes are not more often damaged when one gull grips another's head in this way. A further action picture is the one by J. Edelsten of Great Skuas *Stercorarius skua* displaying (plate 29b); note the chick by the brooding bird. Bird display still receives far too little attention from photographers and so we are glad to be able to include Dr. D. A. P. Cooke's fine study of a lekking Ruff *Philomachus pugnax* on its grassy mound (plate 29a).

It is not easy to obtain a good photograph of a Black Guillemot *Cephus grylle*, but Sidney J. Clarke has succeeded unusually well (plate 30a); note the tones in the blacks and the feather detail. Less difficult species to photograph, but outstanding in detail, are Dr. K. J. Carlson's Common Gull *Larus canus* settling on its eggs (plate 30b) and E. K. Thompson's beautiful picture of an Avocet *Recurvirostra avosetta* approaching its nest (plate 31b). Snipe *Gallinago gallinago* not uncommonly alight on posts, but seldom can anyone have been as successful as Mr. and Mrs. J. B. Bottomley in portraying one in such a position (plate 31a).

Restraint in 'gardening' the nest in preparation for photography is something which many photographers find difficult, but Harold Auger's fine study of a Wren *Troglodytes troglodytes* (plate 32) shows how well this can be done. Similarly, although a number of people have photographed Cattle Egrets *Bubulcus ibis* in Spain and Portugal, most nest-sites have been fairly open and it is less easy to produce as convincing a result as Dr. A. N. H. Peach has obtained at a nest under a heavy canopy of foliage with a complicated criss-cross of twigs and branches for a background (plate 33b); incidentally, this photograph was taken at what is probably the most northerly colony of this species in Europe. Finally, it would be hard to better the definition in D. M. T. Ettlinger's study of a male Red-backed Shrike *Lanius collurio* carrying a bee (plate 33a); in this way the photographer can be of real service to ornithology by obtaining records of food brought to the nest.

ERIC HOSKING

Notes

Surface-feeding and up-ending by Goosander.—In December 1965 and early January 1966, at Chew Valley Lake, Somerset, one and sometimes two female Goosanders *Mergus merganser* regularly fed close to the shore in shallow water near the mouth of a small stream. On many occasions I saw them picking food particles from the water's surface and from just beneath it, much like a dabbling duck does. On 29th December one of them twice up-ended in quick succession, paddling rapidly with her feet in the manner of a surface-feeder. I can find no reference in *The Handbook* to any of the sawbills feeding in this way.

D. WARDEN

[Dr. Janet Kear, of the Wildfowl Trust, comments as follows: 'Diving is, of course, the commonest feeding activity among Goosanders, but most sawbills occasionally "surface-feed" with heads partly submerged. P. Grenquist (*Ornis Fennica*, 19: 25-28) found Goosanders feeding on crustaceans which could be obtained without diving. He analysed hundreds of droppings and his results imply that the birds must have fed at times just below the surface and probably by up-ending.'—Eds.]

Kestrel feeding at bird table.—Recent notes by A. A. Bell and others

and by Dr. J. S. Ash (*Brit. Birds*, 58: 469-470) have described several instances of Kestrels *Falco tinnunculus* feeding on carrion. According to *The Handbook*, this is exceptional. The following behaviour may be even more so. All the observations are my own.

During the winters of 1964/65 and 1965/66 a male Kestrel, presumably always the same individual, made irregular visits to a bird table in Edinburgh. The table is situated about 30 feet from a manor house standing in five acres of wild garden near the Queen's Park and within the city boundary. These visits to the bird table, which lasted up to ten minutes and so provided good opportunities for close observation, were confined to cold spells when food was scarce, though Kestrels occasionally catch small mammals and young birds in the garden at other times of the year.

On one occasion in January 1965 the Kestrel landed on the table and was seen to eat broken dog biscuits and also to tear at frozen cooked Brussels sprouts though it is doubtful if these were actually swallowed. Another notable instance was in November 1965 when the Kestrel was attracted by uncooked bacon rinds; one of these fell to the ground while he was feeding on it whereupon he picked it up in his beak and carried it off.

D. E. BRADLEY

[It seems of particular interest that dog biscuits were eaten. Frederick E. Warburton (*Auk*, 69: 85) described a comparable case of a female American Kestrel *Falco sparverius* which fed on bread in the grounds of a hospital in Toronto, Canada, on several occasions over five days during hard weather in April 1950. On the first two days this American Kestrel flew down to the bread only after watching several Pigeons *Columba livia* eating it.—EDS.]

Nocturnal activity of Kestrels.—A recent paper by J. S. Fairley and A. McLean (*Brit. Birds*, 58: 145-148) on the food of the Kestrel *Falco tinnunculus* in northern Ireland gave the Long-tailed Field Mouse *Apodemus sylvaticus* as the principal mammal prey there, in the absence of voles, and speculated on the circumstances which enable this diurnal predator to feed extensively on such a nocturnal prey species. Since July 1963 I have spent a good deal of time collecting small mammals in the vicinity of Doncaster, Yorkshire, particularly at dawn and dusk. In the winters of 1963/64 and 1964/65 I was trapping in grassland areas where Short-tailed Field Voles *Microtus agrestis* were having a period of abundance. The site in the first winter was a rough field which was hemmed in by buildings and on which a new housing estate had been started. Here, on one or two occasions, I saw a Kestrel arrive over the area and start to hunt during the late afternoon. At first I was surprised by this as the light was so poor that it neces-

sitated the use of a torch for trap-setting, but the bird appeared familiar with the area and subsequent observations by friends living near the site indicated that dawn and dusk visits were quite regular. After more dusk encounters with Kestrels in the following winter, I accepted this behaviour as normal.

My most recent observation of a Kestrel hunting at dusk was on 1st December 1965, at Hatfield, near Doncaster. At 4.25 p.m. GMT that day one arrived over an area of rough grassland and began to hover and circle. I watched it for nearly ten minutes, during which time it made several stoops before it finally flew off into the dusk. The sun had set, but a dull red glow still persisted in the west; the sky was virtually cloudless with half a moon high in the east, though at ground level a slight mist reduced visibility to less than five hundred yards. The weather was cold with frost and a little snow still lay in sheltered places.

Records of crepuscular activity by Kestrels appear to be uncommon, though E. L. Roberts (*Brit. Birds*, 39: 217-218) observed one hovering at 10.25 p.m. GMT on a moonlit night in March and D. F. Owen (*Brit. Birds*, 43: 157) recorded fresh prey under perches early in the day on occasions during the winter of 1947. In an analysis of pellets from a Yorkshire roost between July 1944 and March 1945 by J. C. S. Ellis (*Brit. Birds*, 39: 113-115) the records of Long-tailed Field Mice were all concentrated in the period December to March and were accompanied by an increase in bird prey.

T. M. CLEGG

[It is not uncommon for Kestrels to feed in poor light at dusk and dawn, but Mr. Clegg's interesting observations and summary of some other published records illustrate the regularity of this and show the connection with the prey species concerned.—Eds.]

Sanderling eating bread.—From October 1964 to March 1965, while living in a house adjoining the beach at Hope Cove on the south coast of Devon, we regularly put out bread, peanuts and kitchen scraps on the high-tide line in full view of our windows. Many birds came regularly to take this food, including a flock of a dozen or so Turnstones *Arenaria interpres* which ate both bread and peanuts. However, it is well-known that Turnstones will take food of this kind (*Brit. Birds*, 54: 325-326; 55: 241-244) and what was much more surprising was that on several occasions a Sanderling *Calidris alba* joined them and was clearly seen to eat bread.

TONY and RAE SOPER

Mated Feral Pigeons incubating at two nests simultaneously.—For a number of years a pair of Feral Pigeons *Columba livia* has nested in the loft of an old outbuilding at Ilminster, Somerset. Just the one pair nests there and, as the same two birds have been involved throughout

they have hatched several broods in this time only to lose them all to rats and rats), I have come to recognise them individually. Display and coition have frequently been observed and so I am certain of their sexes.

On 2nd March 1965 this pair had a nest with two eggs on the uppermost of a stack of wooden trays about seven feet above the floor of the building. That clutch was later deserted and a second nest was built in another tray a foot below the first one; this was completely hidden from the other nest and in the opposite corner of the tray. On 17th March the female was incubating two eggs there, but to my surprise I found that the male was now sitting on the eggs in the first nest. I watched for about 20 minutes and both birds continued sitting throughout this time. The situation was the same on 18th and 19th March, with the female on the new nest and the male on the old one, but on subsequent dates both nests were unattended although the eggs were still there and the pigeons were in the building. DAVID E. PAULL

[Derek Goodwin comments: 'Presumably the similarity between the two sites stimulated the off-duty bird to go on to the uncovered eggs. If a male pigeon sees the eggs uncovered or the female off the nest, he will often go at once, out of turn, to cover them'.—EDS.]

Olivaceous Warblers in the Isles of Scilly.—In the autumns of 1961 and 1962 single Olivaceous Warblers *Hippolais pallida* were identified on Agnes, Isles of Scilly. Both records were published in the Rarities Committee's 'Report on rare birds in Great Britain' for the two years concerned (*Brit. Birds*, 55: 579; 56: 405), but this note is intended to increase their documentation in line with customary practice for species with under ten records in Britain and Ireland. The birds concerned were, in fact, the first and second for Scilly and the fourth and sixth for Britain and Ireland.

The first one was found by R. E. Emmett and myself in tamarisks near Cove Vean during the forenoon of 3rd October 1961. Poor conditions and brief views prevented definite identification that day, but, accompanied by P. R. Colston and my wife, we found it again on the morning of the 4th. Aided by a lucky combination of still, fine weather and the bird's choice of an isolated clump of tamarisk to feed in, we were able to make intensive observations for three hours at ranges never exceeding 20 yards. A brown-phase Melodious Warbler *Polyglotta* was present in the same tamarisk and the two birds were often within feet or even inches of one another. Detailed notes and sketches of each were made. Their behaviour, feeding and flight patterns were very similar, the diagnostic characters used to identify the Olivaceous being as follows:

Total length greater and build slightly bulkier than the Melodious; bill noticeably longer and more dagger-like (very prominent even at a distance) with yellowish base to lower mandible (not fleshy-buff as in the Melodious); head shape much flatter with peak of crown usually behind eye; short supercilium and whitish eye-ring; upper-parts generally grey (not brown); under-parts suffused with olive or buff (not yellow); shape of folded wing similar to the Melodious, but chord slightly longer with tips of longest primaries falling to end of upper tail-coverts.

Conscious that all the previous records of Olivaceous Warblers in Britain and Ireland were of ones trapped at observatories, all four of us studied skins of that species, Melodious Warbler, Icterine Warbler *H. icterina* and Upcher's Warbler *H. languida* in the British Museum (Natural History) on 14th October. This comparative material fully confirmed our field identification, the coloured sketch agreeing well with wintering individuals (of the race *opaca*) from Gambia.

Almost exactly a year later, the second one was present from 30th September to 2nd October 1962, at the same time as single Melodious and Icterine Warblers. This unprecedented concourse afforded excellent opportunities for comparison, all three being confined in the same half-acre of tamarisk-bordered field near Cove Vean. Over the three days, all the observers concerned, R. E. Emmett, I. J. Ferguson-Lees, R. Williams, my wife and myself, saw the Olivaceous Warbler in good light at ranges between 30 feet and 50 yards. The following description is a summary of notes and sketches made in the field:

General impression: in character typical of *Hippolais*, but with dagger-shaped bill, bulky appearance, flat crown, rounded wings and total lack of any yellow in its plumage. *Size:* fractionally bigger than the Icterine with more depth to its body and a longer and deeper bill; clearly larger and longer than the Melodious. *Upper-parts:* generally greyish-brown (olive-grey in sunlight); head marked by narrow whitish supercilium (hardly visible behind eye), whitish eye-ring and dark lores; wings virtually uniform with mantle, though primaries darker than rest when folded; tail as rest of upper-parts, but whitish outer feathers once showed briefly as pale edges. *Under-parts:* uniform greyish-white, cleanest on chin and throat and washed pale brownish on sides of breast and flanks. *Soft parts:* upper mandible dark brown, lower conspicuously pale yellow; legs and feet greyish ochre.

One of the bird's most distinctive features was its head, the shape of which was compared by I.J.F.-L. to that of a miniature Starling *Sturnus vulgaris*; it was very prominent at times, even appearing to hang down in flight and looking out of proportion between the short, rounded wings. It was clearly established by R.E.E., I.J.F.-L. and myself independently that the tips of the bunched primaries fell to the base of the tail and not clearly beyond as in the Icterine; the wing point formed by the same feathers did not project conspicuously beyond the folded secondaries, the shape of the closed wing thus being almost identical to that of the Melodious.

It should perhaps be added that both I.J.F.-L. and I had had a considerable previous experience of all three of these species abroad.

D. I. M. WALLACE

Olivaceous Warbler in Dorset.—Just before noon on 5th September 1962 I was waiting in the main street of Easton, on the Isle of Portland, Dorset, when I noticed a small bird on a dead branch of a cypress in an overgrown part of the churchyard. As it sat facing me, its under-parts appeared strikingly white, so much so that at first glance I took it for a flycatcher, but when it turned sideways it immediately revealed itself as a *Hippolais* warbler and a markedly pale one at that. The bird then flew down into dense vegetation, but reappeared after ten minutes when it alighted on a bramble only six or seven yards from me and proceeded to preen itself, occasionally snapping at passing insects. Excellent views were obtained at extremely close range, and initial suspicions that it was an Olivaceous Warbler *H. pallida* were confirmed by the large bill, uniform pale greyish-brown upper-parts and whitish under-parts completely lacking in contrast. After two minutes or so it flew back to the cypress and soon disappeared from view. The remaining ten or so residents of Portland Bird Observatory were then contacted and quickly invaded the village, most of them succeeding in obtaining good views of the bird during the ensuing hour. During this period it successively rested and preened itself in the cypress at heights of up to 20 feet and fed actively in an apple tree and on bramble bushes. It was occasionally noted catching insects on the wing and was once seen with its crown feathers erect. At all times it was silent. The following is a full description of the bird from notes taken on the spot by Miss P. Harris, Dr. A. B. Watson, Mr. and Mrs. J. K. Weston and myself, and from observations by A. J. Hold who had previously seen a number of *Hippolais* warblers at Portland.

Size: no direct comparison possible, but considered to be no larger than a Melodious Warbler *H. polyglotta* present in the observatory area three days earlier. *Structure:* much as Melodious Warbler, but forchcad, though pronounced, noticeably less steep than in the above-mentioned individual of that species; legs relatively long for a *Hippolais* warbler; bill long and noticeably large; closed wing fell just short of longest under tail-coverts. *Upper-parts:* crown grey-brown with olivaceous tinge; lores and ear-coverts paler, fading evenly into the white of the under-parts, and, with faint supercilium, showing yellowish-buff or straw wash in strong sunlight and at very close range; nape, mantle and rump uniform pale grey-brown with an olivaceous tinge discernible only in best light at close quarters; wing-coverts darker than back; primaries and secondaries mid- to dark brown, the secondaries lacking any suggestion of a pale patch; tail mid- to dark brown, no white detectable in outermost feathers. *Under-parts:* off- or buffish-white throughout, purest on under tail-coverts, flanks in some lights acquiring a very pale greyish tinge; faint yellowish-buff or straw wash on chin and sides of throat and breast evident only in

strong light and at closest range. *Soft parts*: upper mandible brown, lower bright yellow, appearing almost orange in bright sunlight; eye conspicuously dark; gape orange; legs in various lights appeared brown, blue slate, slate or merely dark.

The bird could not be found later the same day and was not seen again. This is the fifth record of the Olivaceous Warbler in the British Isles.

G. A. PYMAN

Blackcap imitating Willow Warbler's song.—During the first ten days of July 1965, in my garden at Damerham, Hampshire, a Blackcap *Sylvia atricapilla* often imitated the song of a Willow Warbler *Phylloscopus trochilus* very well indeed, except that it sounded rather louder and harder in quality. He often sang this phrase by itself, several times over, with pauses between; but sometimes followed, never preceded, it by bits of his own song.

The Blackcap's song is known to be often mimetic; but I think that this observation is interesting because I am sure that it was the same individual that had been singing in my garden since April without getting a mate, in which case it is odd that he only began to imitate the Willow Warbler in July; and also because I could not hear a Willow Warbler from the garden (though I suppose that the bird, with his better hearing, might have been able to do so). It therefore seems as if this Blackcap may have had the song 'in his head', but only produced it late in the season. Eliot Howard, in his *The British Warblers* (1907-15), mentioned thirteen species that he had heard imitated by Blackcaps, but it so happened that the Willow Warbler was not one of them.

G. W. H. MOULE

Song Sparrow in Yorkshire.—At about 13.00 hours GMT on 18th May 1964, at Spurn Bird Observatory, Yorkshire, G. R. Edwards heard an unfamiliar song outside Warren Cottage; the bird concerned was partially obscured by foliage in a bush near-by and a back view suggested that it might be a Cirl Bunting *Emberiza cirlus*. He called B.R.S. and soon afterwards the bird moved into full view, whereupon both observers realised, from its well-marked head-pattern and boldly-streaked under-parts, that it was probably an American sparrow. When J.C., B. Armitage, Mr. and Mrs. J. H. I. Leach, Miss A. Leach and R. Harman arrived, it had disappeared, but at about 14.00 hours it was seen near some spiral traps which had been baited with bread to catch Starlings *Sturnus vulgaris*. It moved round one of these traps, obviously attracted by the bait, and within two or three minutes was in the hand. It was identified as a Song Sparrow *Melospiza melodia* with the aid of Roger Tory Peterson's *A Field Guide to the Birds* (1947) and the account by Peter Davis and Roy H. Dennis of the one trapped on

air Isle in 1959 (*Brit. Birds*, 52: 419-421). It was weighed, ringed and photographed (see fig. 1), and a detailed description and measurements were taken. When it was released it flew into the long grass at the side of the Heligoland trap and went under the wire and into the bushes. Later it was retrapped there and, on being released for the second time, flew to some bushes further south. It was not seen again.

The following details are condensed from the description taken in the hand by J.C. (measurements by B.R.S.) and checked by the other observers listed above:

Upper-parts: forehead, crown and nape dark chestnut-brown with blackish or dark brown centres to feathers and a narrow greyish crown-stripe (more obvious at a few feet than in the hand); crown feathers slightly abraded; superciliary (extending above ear-coverts) and lores greyish-white; line behind eye and below ear-coverts chestnut-brown, darker in centre; chestnut spot on greyish-white orbital ring where this line met the eye; mantle and back chestnut-brown with slightly darker feather centres; scapulars similar but a little brighter; rump and upper tail-coverts as mantle and back but a little darker by the feather shafts. *Wings:* lesser coverts warm brown with slight buff edges and tips; median coverts slightly darker with buff edges and tips, each feather with a still darker area by the shaft forming a spot towards the tip; greater coverts warm brown with very slightly darker centres (innermost three with dark brown centres) and whitish buff edges to outer webs; bastard wing and primary-coverts dark brown on inner webs, brown on outer webs with warmer-coloured edges; primaries dark brown on inner webs, warmer brown on outer webs with narrow pale brown edges; secondaries as primaries but without pale edges; tertials as secondaries but darker on inner webs (and with narrow whitish edge to outer web of central one). *Tail:* rectrices brown, slightly warmer on outer webs, especially on basal halves where chestnut-brown; two central feathers generally paler than rest; narrow edges to outer webs of outer feathers faded brown; tail rounded and slightly notched. The dark centres to most of the feathers of the upper-parts were not clear cut. The tail was worn and the primaries, especially the inner ones, slightly so; fault bars on the tail suggested a first-year bird. *Under-parts:* ground colour of whole under-parts whitish or greyish-white (as superciliary), slightly whiter on belly and washed slightly buff on flanks and under tail-coverts; two narrow dark chestnut-brown malar stripes with greyish-white in between, the lower one darker in the centre; upper breast and flanks streaked dark chestnut-brown with dark brown or blackish centres to streaks; under tail-coverts with brown centres, darker by the shafts; under wing-coverts whitish, tinged slightly buff. There was only a suggestion of a dark spot in the centre of the upper breast when the feathers were rearranged. *Soft parts:* upper mandible slaty with pale grey cutting edge towards base; lower mandible pale grey, darker towards tip and slightly pink at base underneath; eye dark grey-brown; legs pink-brown; feet brown. *Measurements:* wing 66 mm.; tail 69 mm.; tarsus 23 mm.; bill 14 mm. to skull, 12 mm. to feathers; weight 24 grams. *Wing-formula:* 4th and 5th primaries equal and longest; 2nd 7 mm. shorter; 3rd 1 mm. shorter; 6th 1.5 mm. shorter; 1st 6.5 mm. shorter than primary-coverts; 3rd, 4th, 5th and 6th emarginated.

On the ground the Song Sparrow behaved rather like a Dunnock *Emella modularis*. It seemed to be a great skulker and evidently spent



FIG. 1. Song Sparrow *Melospiza melodia*, Spurn, Yorkshire, 18th May 1964
(photos: J. Cudworth)

most of its time on the ground or low in cover. Its legs looked long and strong, and B.A. noted that it once ran a few feet. It held its tail slightly raised and moved it up and down. When it was released, B.R.S. noted that it also moved its tail up and down in flight after the manner of an *Acrocephalus* warbler. In flight it appeared a uniform reddish-brown and B.R.S. was struck by the rounded tail the first time he saw it. The characteristic dark spot in the centre of the upper breast could be seen in the field, but its conspicuousness seemed to be affected by the feather arrangement. G.R.E. described the song as like the ending of that of a Lesser Whitethroat *Sylvia curruca* plus three clear notes. When the bird was being removed originally from the spiral trap it uttered a thin and fairly high-pitched note two or three times.

The weight of 24 grams is heavy for this species and is the same as the weight of the one on Fair Isle after a stay of at least nine days. Mrs. M. M. Nice in her *Studies in the Life History of the Song Sparrow*, vol. 1 (1937), gave the mean weight of 20 males in May as 21.2 grams (range 19.6 to 23.4 grams). In fact, there is some evidence that this Song Sparrow had been present at Spurn for at least five days previously: on 13th May B.R.S. saw a small, reddish-brown bird fly to one side of the Heligoland, but he could not find it again; and on the 17th J.C. had a similar brief view in the same general area.

There was nothing in the plumage examination to suggest that the bird might have escaped from captivity. The feathers of its forehead were not damaged, nor were its primaries and tail feathers more worn than might be expected at this season. In any case, enquiries through

vicentra, Belgium, suggested that Song Sparrows have never been reported in Europe. This is only the second record of this North American species in Britain and Europe.

B. R. SPENCE and JOHN CUDWORTH

House Sparrows avoiding mealworms.—During December 1965 I placed small numbers of mealworms *Teuebrio molitor* each day on a bird table in my garden at Brentry, Bristol, with the object of attracting Robins *Erithacus rubecula*. I also put out bread, as I have done for years; normally this is quickly taken by the numerous House Sparrows *Passer domesticus*. However, I noticed that when there were mealworms on the table the House Sparrows would not alight there even though no other bird was present. They would fly to the table, but would sheer off on seeing the mealworms or, having landed, would fly away rapidly as though frightened. This happened whether the mealworms were static or wriggling. When the mealworms had been taken by Robins or Starlings *Sturnus vulgaris*, then the House Sparrows would return to finish the bread. I should add that there were never more than five to ten mealworms scattered on the table, which is 12 inches by 9 inches in size.

But this avoidance is evidently not absolute. In the first week of January 1966 I several times saw a male House Sparrow take mealworms, though only the one individual was involved. Evidently House Sparrows can acquire a tolerance of mealworms and even a liking for them.

A. P. RADFORD

[The House Sparrow is unique in being more wary than other birds at any slight change in the environment and also in being bold once it has familiarised itself with the change. This is one of the traits which has made it so successful in human settlements. The reactions described above doubtless had nothing to do with a specific fear of mealworms, but are more likely to have been a normal response to what were new objects to the individuals concerned. It is interesting, too, that only a few mealworms were involved. Derek Goodwin comments that Feral Pigeons *Columba livia* may show fear of a lot (not necessarily a heap) of any unfamiliar seed although eating it freely if it is only scattered. He adds that he has often thrown mealworms to House Sparrows in London and that usually they do not eat them although they show no fear at all of them, peering closely at them and often picking them up, but then discarding them.—EDS.]

Female House Sparrow eating corpse of male.—On 19th July 1965, while travelling between Corby and Thrapston, Northamptonshire, I saw a female House Sparrow *Passer domesticus* tearing at the

corpse of a bird on the road near the village of Sudborough. My first thought was that she might be collecting feathers for a nest, but she distinctly tore off and swallowed two strips of flesh. The remains proved to be those of a male House Sparrow. They were quite fresh (the bloodstains on the road were still wet) and there was no trace of any ants which might otherwise have been the attraction. The body was only partly crushed and, if this was in fact the female's mate, she might conceivably have flown down to it in an attempt to get some reaction. However, there is no doubt that she was eating the flesh by the time I saw her.

N. L. HODSON

Review

Project Mar: the conservation and management of temperate marshes, bogs and other wetlands. Volume 1, Proceedings of the Mar Conference, compiled by the IWRB/MAR Bureau under Dr. L. Hoffmann; IUCN Publications new series, no. 3, 1964; 475 pages; F.25 or £1 17s. Volume 2, List of European and North African wetlands of international importance, compiled by P. J. S. Olney and the IWRB/MAR Bureau; IUCN Publications new series, no. 5, 1965; 89 pages and 10 maps; F.13 or 19s. Obtainable from Station Biologique de la Tour du Valat, Le Sambuc, Bouches-du-Rhône, France.

Organised by the International Union for the Conservation of Nature, the International Council for Bird Preservation and the International Wildfowl Research Bureau, the Mar conference was held at Les Saintes-Maries-de-la-Mer, in the Camargue, France, from 12th to 17th November 1962. It was attended by 84 representatives of 16 nations and its purpose was to consider the dangers which the indiscriminate elimination of wetlands is causing to wildlife in this important range of habitats.

The first of the two resulting volumes is devoted to the conference itself, the papers read, the discussions arising and the resulting resolutions. The main divisions into which the papers fell were: reasons for conservation; basic criteria for defining reserve areas and ways of achieving protection; management and utilisation; restoration of modified wetlands; wildlife and utilisation of man-made aquatic habitats; and international efforts for conservation. Important contributions from the Nature Conservancy, the Royal Society for the Protection of Birds and the Wildfowl Trust drew on experience gained in Britain.

One of the recommendations of the conference was that the I.U.C.N. should compile a list of European and North African wetlands of international importance, together with detailed information on these areas, to be available for conservationists and those responsible for development schemes. In fulfilment of this, the second volume lists the major wetlands in 30 countries of Europe (including Turkey) and North Africa (east to Tunisia) and gives a series of maps showing the locations of the selected sites. The areas are divided into two categories: A, those of major importance for the conservation of European wetland bird populations; and B, those of still vital importance for migratory birds although not usually harbouring such huge concentrations or such rare species as A sites.

The A sites listed under Great Britain are Loch Leven, Kinross; the Norfolk Broads; the coastal broads of Suffolk and the Essex marshes; the north Norfolk marshes; Abberton Reservoir, Essex; the Solway Firth; the Northumberland coast; and the Wash and East Anglian fens. The B sites are the Bristol Channel and Severn Estuary; the Dorset coastal lagoons and marshes; the Humber Estuary; the Firth of Tay; the Eden Estuary and lochs in Strath Earn; South Uist; the north Cheshire estuaries and meres; eastern Aberdeenshire; and the north Kent marshes and estuaries. For Ireland the A sites are the North and South Slob, Co. Wexford; the Inishkea islands, Co. Mayo; Tralee Bay and Castlemaine Harbour, Co. Kerry; and, in Northern Ireland, Lough Neagh and Lough Beg. Category B sites there include Bull Island, Dublin Bay; the Shannon and Fergus tidal estuaries, Cos. Clare and Limerick; Kilcools coastal marshes, Co. Wicklow; Rahasane Lough, Co. Galway; Lough Swilly, Co. Donegal; and, in Northern Ireland, Strangford Lough and the Downpatrick marshes; Lough Erne; and Lough Foyle.

With a few exceptions (notably Turkey, where more detailed information is urgently required for all sites, some of which appear to be of extreme ornithological importance both as wintering and breeding localities), the particulars given about each site include its size, its ecological categories, a general statement on the area, and a short description of its ornithological features. Slightly over 200 sites are listed for Europe, excluding Russia; a few sites are also given for European Russia, but it is stated that a list following the same criteria as those used for other European countries would involve a further 200 sites. The ornithological information about each site is necessarily sketchy and limited to the highlights, but one can for example find four or five Mediterranean breeding sites of the Flamingo, a reserve where 10,000 Red-breasted Geese and several million ducks winter, breeding grounds of such scarce species as Black Stork and Egyptian Nightjar, and so on.

To compile these data, about 500 experts over the whole of Europe were approached, and four expeditions were organised in the winters of 1962/63 and 1963/64 to collect information on wetlands in Portugal, Morocco, Greece and Yugoslavia. Among other countries with inadequately known areas are Albania, Algeria, France and Poland. Several Mediterranean countries have a number of wetlands of extreme importance, but there is considerable lack of information on the relative values of these sites, especially for wintering and migrating birds. Drainage schemes and industrial and urban expansion are proceeding all too rapidly, and it is vital that more information should be forthcoming before many of these areas are irretrievably lost.

The authors of this list hope that its production will invoke more interest and elicit more research and knowledge. Before the war, nearly all British ornithologists appeared to be blind to the attractions of the Mediterranean in summer and, despite increased leisure, they still seem oblivious to the even greater merits (from some points of view) of a visit there in winter. If anyone with a week or more to spare should wish to break new ground for himself and for ornithology and, through undemanding recording of numbers and species seen, to contribute badly-needed information to a worthy cause, I suggest that he should buy a copy of volume 2 and from it choose localities in any one of half-a-dozen or more countries. P. A. D. HOLLON

Letters

The identification of the Hampshire Cetti's Warbler

Sirs,—The letter from Dr. C. Suffern on the subject of the Hampshire Cetti's Warbler *Cettia cetti* (*Brit. Birds*, 56: 516-518) contains so many mis-statements that a detailed exposure would be tedious both for me and for your readers. Moreover, the answer to many of his assertions could only be upon the lines that R. H. Charlwood and I have a very different recollection of what actually took place on our visit to Titchfield Haven, Hampshire, on 16th March 1961. Thus, for example, Dr. Suffern attempts to provide supporting evidence for his strange claim that I never really saw the bird at all by belatedly posting himself by my side while I was watching it and assigning to R.H.C. the rôle of putting it up from the reeds, whereas R.H.C. and I most distinctly recall that it was Dr. Suffern himself who kindly went into the reeds and R.H.C. who remained with me. Fortunately, however, I have in my possession contemporary evidence of the correctness of the main statements in our original letter from sources which I am confident that you, Sirs, will find unexceptionable.

(i) 'Dr. C. Suffern telephoned me today to say that he and others had identified a Moustached Warbler *Luscinola melanopogon* at Titchfield Haven, Hampshire. The bird had been heard singing on a number of occasions since Saturday 4th March, but it was only this morning that it was seen properly and identified. As the few records of Moustached Warbler in Britain are still questioned in some quarters, it is clearly desirable that as many experienced observers as possible should see this bird. I am therefore sending this preliminary notice to a selection of likely people.' (From a circular letter sent out by I. J. Ferguson-Lees, dated 7th March 1961.)

(ii) 'Suffern has told me on the phone this evening that he has got two tape recordings of his Moustached Warbler, and that . . . and . . . saw it today and support identification.' (From a card from P. A. D. Hollom to myself, dated 9th March 1961.)

(iii) 'Many thanks for Thursday's phone call. I went down to see the bird on Sunday when, as you may have heard, we netted it—a good Cetti's, of whose identification we were certain before it was in the bag. Apart from appearance, song was quite typical and distinctive. Congratulations on getting to it first, and your firm rejection of Moustached.' (From a letter from P. A. D. Hollom to myself, dated 22nd March 1961. The phone call mentioned was one which I made on 16th March, as soon as I had returned from—*pace* Dr. Suffern—seeing the bird, to inform P.A.D.H. that it was, in fact, a Cetti's, not a Moustached as had been supposed till then.)

(iv) 'Like you I am thankful the bird didn't leave before March 16th. I am not sure we would have been presented with fully adequate field notes, but it would certainly have been a difficult one to decide.' (From a letter from P. A. D. Hollom to myself, dated 27th March 1961. This was in reply to a letter in which I had pointed out that if the bird had left before R.H.C. and I saw it on 16th March it might well have been accepted as a Moustached Warbler on the 'evidence' provided by Dr. Suffern and others.)

With Dr. Suffern's basic contentions thus refuted, I shall leave it to our readers to judge the probability of his other statements being correct.

I should, I think, not conclude without pointing out, in reply to the piece of schoolboy irony from B. A. E. Marr, that, as specifically stated in our original letter, R. H. Charlwood and I claim no special merit for having been the first to expose this error. The remarkable facts, which we particularly wished to emphasise, were that such a mistake was made at all and, once made, was not corrected much earlier. There are lessons for all of us in this and I can only wish that Dr. Suffern had been ready to accept them.

D. D. HARBER

Sirs,—D. D. Harber's vague accusation of 'so many mis-statements' is worth little without supporting details. In fact, he attempts to substantiate only two. His account is based on his and R. H. Charlwood's recollections, whereas mine is based mainly on field-notes.

I did not say that Mr. Harber did not see the bird. I said that he claimed that he had not seen the bird at any of the several times that Mr. Charlwood had flushed it, until Mr. Charlwood managed to get quite close to it and called out that it was not a Moustached Warbler. Then Mr. Harber immediately echoed Mr. Charlwood's words; so presumably he saw the bird this time.

For the sake of brevity I did not relate in my letter all my movements. I went (possibly with somebody else) into the reed-bed to show that one would not sink into the river by so doing and to flush the bird if possible. Once it was flushed, I came out and stood by Mr. Harber's side on the bank. I left Mr. Charlwood to stalk the bird alone, as I did not wish to be accused of impeding him.

Mr. Harber adduces evidence from third parties, but not from me, that I had identified the bird. I cannot be held responsible for their wrong opinions. I never had identified the bird and the whole operation, including the presence of Mr. Harber in Titchfield Haven, was entirely for the purpose of identifying an unidentified bird.

Mr. Harber's suggestion that, if he had not identified the bird, it might have been accepted as a Moustached Warbler is wide of the mark so far as I am concerned. I was waiting for the bird to be identified. I cannot be responsible for what others might or might not have done.

As for refuting my 'basic contentions', Mr. Harber has done nothing of the sort. On the contrary, I advise him to study the last one and a half lines of the editorial comment which accompanied the three letters on the Cetti's Warbler published last December (*Brit. Birds*, 58: 516-520).

C. SUFFERN

[This correspondence is now closed.—EDS.]

News and comment

Edited by J. L. F. Parslow

Retirement of E. M. Nicholson from the Nature Conservancy.—By far the most significant development in the field of conservation in Britain in the years since the last war has been the establishment of the Nature Conservancy and its subsequent growth into the strong and influential body we know today. The story of the Conservancy's success owes almost everything to the policies and many talents of one

an, E. M. Nicholson, C.B., who became its second Director-General soon after formation, and who has recently relinquished the post after 14 years in office. Max Nicholson was concerned with the Conservancy from its very beginnings, being a member of the special committee formed in 1945 which drew up the plans for the conservation of nature in England and Wales, and a charter member of the official Nature Conservancy when it was formed in 1949. Previously, among many other achievements, not the least of which was a distinguished Civil Service career in Whitehall, he was the person chiefly responsible for the formation of the British Trust for Ornithology (of which he became the first secretary). More recently, his recognition of the important part to be played in conservation by voluntary effort led to his founding (with Lord Hurcomb) of the Council for Nature.

No one with the dynamism and energy of Max Nicholson would ever consider retirement' in the more generally accepted sense of the word, and naturalists everywhere will be glad to know that as Convenor of the Conservation Section of the International Biological Programme, with an office at the Nature Conservancy's London headquarters, his counsel and widespread conservation experience will continue to be fully employed. He will, of course, also remain on the editorial board of *British Birds*.

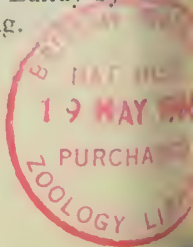
Max Nicholson's successor as Director of the Nature Conservancy is Dr. L. E. D. Poore. Dr. Poore was on the botanical staff of the Nature Conservancy in Edinburgh from 1953 to 1956, and in 1955 was seconded to Hunting Technical Services to undertake a Range Classification of Jordan. From 1956 to 1957 he worked for Hunting Technical Services on the mapping of uncultivated land in Cyprus to show its potential for pasture improvement. In 1958 he reported on the management of vegetation for catchment protection on the Diyala River, Iraq, and in 1959 was consultant to the survey of the catchment of the Mangla Dam, West Pakistan. From then until 1965 he was Professor of Botany and later Dean of Science at the University of Malaya, Kuala Lumpur, also taking part in the Royal Society expeditions to Mount Kinabalu in Sabah.

The work of the Game Research Association.—The recently published *5th Annual Report of the Game Research Association* (obtainable from its secretary at 12 Northbrook Street, Newbury, Berkshire, price 5s. 6d. post paid) contains much evidence of the wide scope of the research being undertaken by the Association's scientific unit, under Dr. J. S. Ash, and of the valuable contribution it is making to wildlife conservation generally. The interest of the report is by no means confined to the game biologist or to the shooting fraternity. Contributions to it fall under two main headings. The first covers the Association's own research programme on game-bird populations, habitats, disease and so on, while the second consists mainly of more general articles on the work of other organisations, such as the Wildfowl Trust, the British Trust for Ornithology, and the Nature Conservancy's research stations in Aberdeenshire and Huntingdonshire. Of particular interest to the general ornithologist are papers on a recent increase in numbers of Red-legged Partridges in East Anglia (which also includes much useful information on the populations of this species and the Partridge in other regions), and on the National Game Census. This latter enquiry, covering all parts of England, Scotland and Wales, is providing valuable numerical data on game bags, on Partridge population densities and survival, and on numbers of pests and predators destroyed, over survey areas which now total more than a million acres for some of the subjects being studied. Among many other papers is a brief report by Dr. R. P. Bray of a population study of wild and hand-reared Pheasants on a Dorset estate; further details of this interesting study are printed separately in a second recent publication of the Association, entitled 'Progress report on the Pheasant study 1965'.

A new R.S.P.B. reserve in Dorset.—The Royal Society for the Protection of Birds has recently announced the acquisition of an important new reserve over a substantial area of heathland on the Arne Peninsula, which lies on the north-west side of Poole Harbour, Dorset. At present the Society has leased 308 acres to the south of Arne village and is negotiating for a further 400 acres to the north. The reserve is principally dry heath, vegetated with heather but also containing several quite large areas of gorse and some woodland, mainly of Scots pine. It includes some areas of wet heath and also a stretch of the shore-line of Poole Harbour, which here, although having some patches of open mud, is chiefly overgrown with *Spartina*. Breeding birds include Nightjars, Stonechats and, most important of all, a few pairs of Dartford Warblers, with which species especially in mind the future management of the reserve will be carried out. This new reserve is particularly welcome in view of the continuing rapid disappearance of the Dorset and west Hampshire heaths to forestry and urban and agricultural development, which together over the last 25 years have been swallowing up heathlands in this area at an average rate of 700 acres each year. The newly appointed warden is B. P. Pickess. Visiting the reserve will be strictly by permit only. For further details write to The R.S.P.B., The Lodge, Sandy, Bedfordshire.

The birds of Pagham Harbour.—To ornithologists from London and its surroundings, Pagham Harbour has long been regarded as one of the best and most conveniently situated bird-watching sites on the south coast, and the declaration in October 1964 by the West Sussex County Council of the harbour's establishment as a local nature reserve was thus personally welcomed by naturalists from much farther afield than Sussex itself. It is appropriate, therefore, that a new 40-page publication, *The Birds and Mammals of Pagham Harbour* by W. W. A. Phillips, should appear now that the harbour seems assured of a future free from commercial development or other spoliation. The 21 species of mammals listed occupy only two pages of the booklet, and almost the whole of the rest is devoted to an annotated list of the birds of the area. For the most part, the brief summaries under each species or subspecies provide a useful guide to the status of the harbour's birds, while the casual bird-watching visitor, for whom the booklet is primarily intended, will also find the sketch-map showing about two dozen 'recommended observation points' particularly useful. However, some criticism must be made of the author's preoccupation with trinomialism. In a local work dealing mainly with field observations, classification at the subspecific level seems inappropriate and unnecessary, and when used uncritically can lead to ambiguity. For example, it is implied that the four Bluethroats recorded (three in autumn) were all of the race *cyaneola* (which, if true, should have been more clearly stated), while under British and Scandinavian Lesser Black-backed Gulls (where, incidentally, there has been an unfortunate transposition of either the scientific or vernacular names) the status summaries are virtually identical, except that summering birds include *immatures* of the 'Scandinavian' race. The list also includes about twenty records of rare birds (e.g. Marsh Sandpiper and Aquatic Warbler in spring 1961, and Lesser Grey Shrike in July 1962) which appear not to have been published elsewhere and which should surely have been documented, particularly as we understand that they have all been rejected by the Rarities Committee or *The Sussex Bird Report*. The booklet is published by the Bognor Regis Natural Science Society and can be obtained, price 5s. 6d. post paid, from its honorary secretary at 1 Coastguard Cottages, Aldwick, Bognor Regis, Sussex.

New warden for Lundy.—C. S. Waller, a former assistant warden at Fair Isle, has been appointed warden of the bird observatory and field station on Lundy by the Lundy Field Society. He took up his duties there in the early spring.



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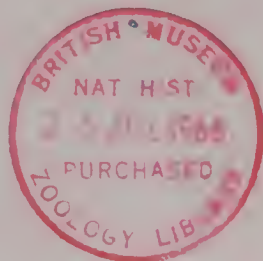
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Vol. 59
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British Birds

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The birds of Inner London 1951-65

By Stanley Cramp and A. D. Tomlins

INTRODUCTION

INNER LONDON is the term, first used by A. Holte Macpherson, to describe the central zone of one of the greatest urban agglomerations in the world; a rectangular area with boundaries four miles east and west and two-and-a-half miles north and south of Charing Cross, Westminster. This urban core is of great ecological interest and, as its birds have been observed more regularly and for a longer period than any other similar area in the world, it offers an unrivalled opportunity to examine the continuing changes and adaptations of various species over many years to the pressures of human beings and their civilisation. In an earlier paper (Cramp and Teagle 1952) dealt with all the species occurring in Inner London between 1900 and 1950, with particular attention to the status and distribution of the more frequent ones. The present paper describes the developments since 1950, concentrating mainly on the breeding birds and attempting to make some estimates of their numbers and fluctuations.

DESCRIPTION OF THE AREA

The 40 square miles of Inner London can be conveniently divided into the main habitats—the closely built zone, the public and private squares, the gardens of houses, the parks, and the docks and waterways. A sixth habitat, the areas devastated by the wartime bombing, was of great ornithological importance for many years after 1941, but has now largely gone. Areas are cleared for redevelopment from time to time, however, and for brief periods these may continue to provide similar ecological conditions.

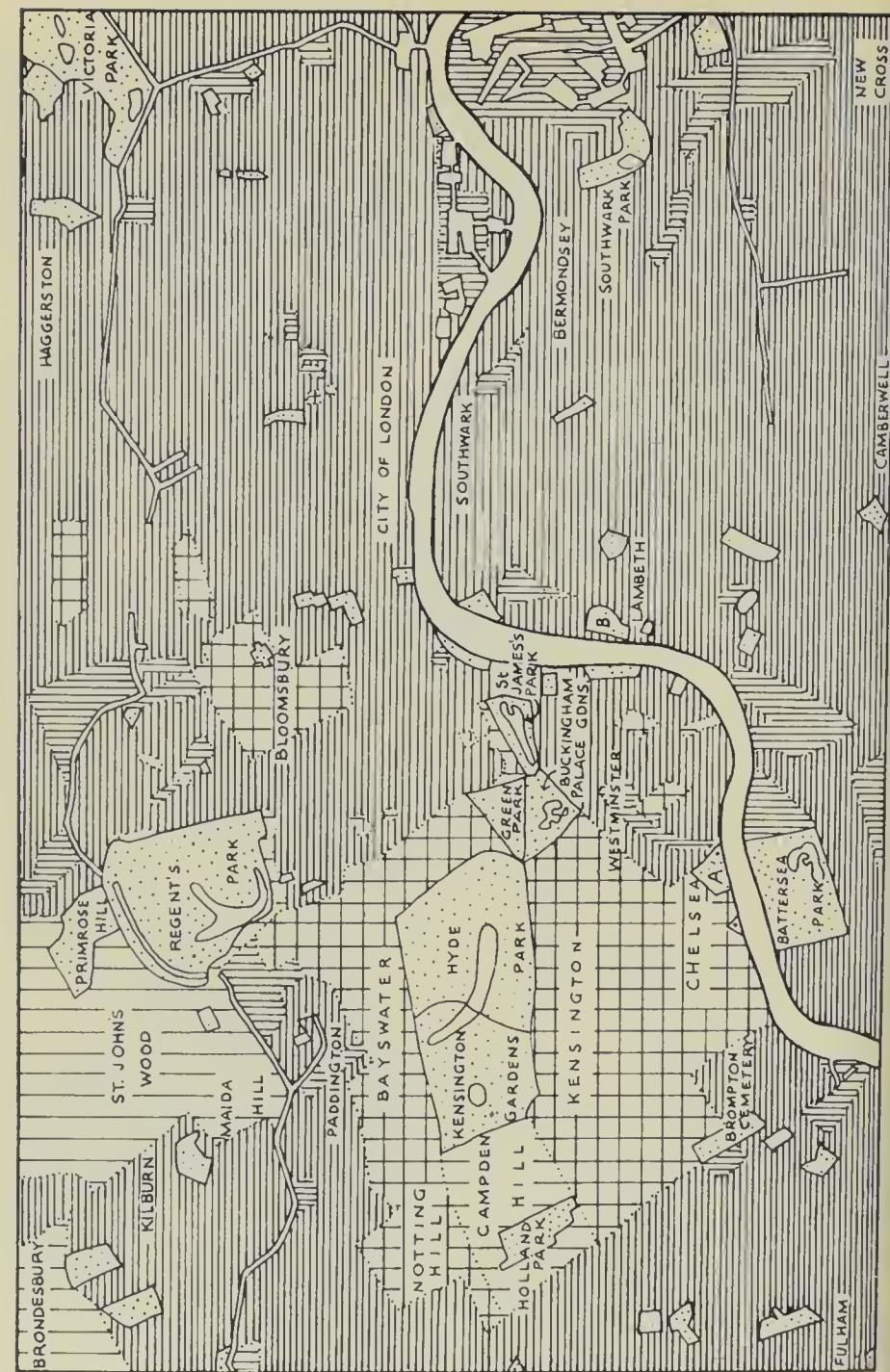
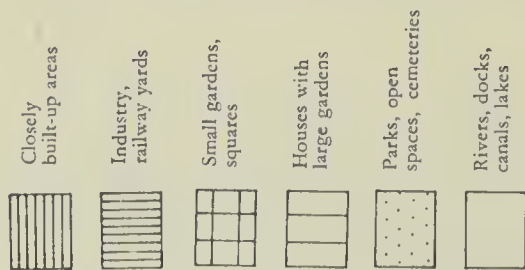


FIG. 1. Map of Inner London (8 miles by 5 miles) to show broad habitats and localities mentioned in text



A=Chelsea Hospital and Ranelagh Gardens

B=Archbishop's Park and Lambeth Palace

As might be expected, the closely built zone is the most extensive of these habitats, but it is much more restricted in the western half of Inner London (see map). A line drawn north and south just east of the Temple, on the western edge of the City, cuts the area into two radically different parts. The 16 square miles to the east, almost bisected by the Thames, is, like the centres of most large cities in Britain, almost entirely made up of houses with little or no gardens, flats, offices, industry, railways and docks. The only major exceptions are two parks, one to the north of the river (Victoria Park, 217 acres) and one to the south (Southwark Park, 63 acres). To the west of the Temple, however, the closely built zone makes up less than one-half of the 24 square miles. Here there are a number of extensive parks north of the Thames (Regent's Park (472 acres, or with the adjoining Primrose Hill almost 700 acres), Hyde Park (361 acres), the adjacent Kensington Gardens (250 acres), Holland Park (54 acres), Green Park (52 acres) and St. James's Park (53 acres)—and to the south Battersea Park (200 acres). All except two of these, Holland Park and Green Park, have lakes with grounds suitable for nesting waterfowl. Near to the parks are large areas in Kensington, Chelsea, Paddington, Notting Hill, Westminster and Bloomsbury with many houses with gardens of moderate size and, more important, a liberal sprinkling of open spaces—the public and private squares with lawns, trees and flowers, varying in size from less than one acre to six or more. There are also some larger, special open areas, such as the garden of Buckingham Palace, Ranelagh Gardens (Chelsea), Lincoln's Inn and Gray's Inn and, south of the river, the green oasis round Lambeth Palace. Finally, there are three districts of houses with larger gardens—Campden Hill, adjoining Holland Park in Kensington; St. John's Wood, abutting on Regent's Park; and, in the north-west corner, Brondesbury. All these help to give Inner London an unusually varied breeding avifauna for the centre of a large city.

THE BREEDING SPECIES 1951-65

The list which follows summarises the status of all species which are known to have bred, or tried to do so, in Inner London between 1951 and 1965, and attempts, perhaps somewhat rashly, to make an estimate of the numbers of breeding pairs in each case. Two points should be made. First, although Inner London has been studied by ornithologists more closely and for a longer period than any area of equal size, there are important gaps. Most neglected is the eastern section, whose congested monotony often offers little prospect of exciting discoveries, but there are more favourable places in the west, such as Ranelagh Gardens and Brompton Cemetery, for which records are disappointingly irregular. Against this, however, two important open spaces in

the west for which little was known between 1900 and 1950 have recently become more accessible to ornithologists. These are the grounds of Holland House, converted into a public park after 1951 (Brown 1963, 1964) and, since 1961, the garden of Buckingham Palace (Cramp and Spencer 1964). Moreover, between 1959 and 1965 D. I. M. Wallace set a new high standard for the intensive observation of an urban area in his studies of the birds of Regent's Park, revealing not only the unexpected richness of the migrants and occasional visitors, but assessing also fluctuations in the breeding populations (Wallace 1961 and in preparation). Other observers have been inspired to follow his example, so it has been possible for the first time to attempt to reach some approximations of the size of the breeding populations of Inner London's birds. These are based on estimates, mostly in recent years, for all the major parks in the western section, the detailed studies mentioned above for Regent's Park, Holland Park and the garden of Buckingham Palace, a 15-year series of approximately weekly counts in the Bloomsbury squares (Cramp unpublished) and general surveys and observations of other districts, together with many records furnished by members of the London Natural History Society. The gaps in observation already discussed are not likely to be serious in assessing the populations of the great majority of species, except to a limited extent for Victoria and Southwark Parks, Brompton Cemetery and, for one or two species like the Black Redstart, the bombed areas, especially those in the east and south. For the five really common species, however, the possible errors are much greater, but even here the estimates should provide a reasonable basis for assessing major changes in the future. That such changes are almost certain can be seen from those that have occurred even within the relatively short period from 1951 to 1965, which are outlined under the different species below and then discussed in more detail later.

Grebes (Podicipedidae)

The Little Grebe *Podiceps ruficollis* nested occasionally in St. James's Park and Regent's Park between 1900 and 1945, but by 1950 it was believed to be breeding regularly only in the grounds of Buckingham Palace. It ceased to breed there soon after, due either to the removal of suitable cover or to changes in the lake's food supplies. More surprising were the attempts of a pair of Great Crested Grebes *P. cristatus* to breed in Regent's Park in 1964; after two nesting sites had been started, eggs laid at a third were stolen.

Ducks, geese, and swans (Anatidae)

Although the Thames, which runs through the area, now offers few nesting sites, the presence of lakes in most of the parks, aided usually by

active benevolence of the public, makes Inner London a favoured breeding area for water-birds. Two, the Tufted Duck *Aythya fuligula* and the Coot *Fulica atra*, were gained as regular breeding birds between 1900 and 1950; and since then two more, the Canada Goose *Branta canadensis* and the Pochard *Aythya ferina*, have become established. A number of full-winged Canada Geese were released in Hyde Park in 1915 and, assisted no doubt by the presence of a pinioned flock in Regent's Park, they have increased and spread. They now nest or attempt to do so regularly in St. James's Park, Regent's Park, Hyde Park and Kensington Gardens, Battersea Park and the garden of Buckingham Palace. There are now between ten and 15 successful breeding pairs each year, with several more failing to nest. The Pochard was not included in the list of breeding birds in 1900-50 because nesting was restricted to St. James's Park where its persistence might have been dependent on the presence of pinioned birds. It has since, however, spread to other parks, nesting regularly in Regent's Park since 1953, in Battersea Park in most years since 1954, in Hyde Park and Kensington Gardens from 1959 to 1962 and at least occasionally on the lake in the garden of Buckingham Palace. Its breeding strength probably varies between five and 15 pairs.

Before 1950 the Tufted Duck bred regularly in St. James's Park, in Hyde Park and Kensington Gardens from 1924 until at least 1938, and occasionally in Regent's Park and perhaps Battersea Park, while it may have nested in most years in the garden of Buckingham Palace and perhaps Victoria Park. In the last 15 years it is known to have nested regularly in St. James's Park, in Regent's Park each year since 1957, in Hyde Park and Kensington Gardens in most years since 1954, in Battersea Park intermittently since 1955, in the garden of Buckingham Palace during 1961-64 (and probably other years) and in Victoria Park in 1957 (and possibly other years). It has tended to recover and even extend its pre-1940 range and, although the number of breeding pairs, and even more the number of young reared, fluctuates from year to year and the position is further complicated by the presence of non-breeding adults (Gillham 1957), it appears that there has been some increase since 1950 in a nesting population varying in recent years between 40 and 50 pairs, and perhaps occasionally more.

The existence of pinioned waterfowl of many species, some of which are allowed to produce free-flying young, such as Ruddy Shelducks *Branta ferruginea* and Red-crested Pochards *Netta rufina*, will continue to complicate the picture, but the other species of duck with a wild breeding population is the Mallard *Anas platyrhynchos*. The Mallard is the most widespread and the most numerous, breeding in all the parks where there is open water and in some open spaces with little or none (e.g. Holland Park). It also nests in some of the docks, but rarely

along the Thames because of the shortage of suitable sites, though pairs have used the timbers when Waterloo Bridge was under construction and more recently a duck sat steadily on a pile of life-belts on the deck of a pleasure steamer making many trips a day along the river. Nests in holes in trees are still common, sometimes well away from water, but there have been fewer reports recently of nests on buildings and one site popular for some years after 1941, the emergency water tank, has now almost gone. There are too few population counts to indicate whether the total population is changing, though Wallace (1961) noted a definite increase in Regent's Park between 1947 and 1959 with some decline in numbers since. For the same reason any estimate of breeding numbers must be highly tentative, but they perhaps range between 250 and 500 pairs.

The Mute Swan *Cygnus olor* still breeds in small numbers on the park lakes, when allowed to do so, and occasionally elsewhere—fairly regularly on the Grand Union Canal in Paddington and once in a creek by the Thames. There are signs of some decline in recent years and the numbers of non-breeding birds along the river have fallen even more markedly (Cramp 1963). The breeding population now varies between one and five pairs.

Diurnal birds of prey (Accipitridae and Falconidae)

Inner London has few avian predators, either diurnal or nocturnal. The Sparrowhawk *Accipiter nisus* made its only attempt at nesting in 1953, when eggs were laid (but no young seen) in Holland Park. It has become markedly less frequent as a visitor in the last ten years. The Kestrel *Falco tinnunculus* bred again in Inner London, after a long absence, in 1931, and then increased notably in the next twenty years, with at least six pairs suspected of breeding in 1948 and five pairs known to have nested or attempted to nest in 1950. Since 1950, however, the known nests have not exceeded two in any one year and, though some are probably overlooked, there has undoubtedly been a decline. Although the effects of toxic chemicals cannot be entirely excluded, the increase of the Kestrel in the 1940's was almost certainly connected with the increased supplies of rodents and insects on the devastated areas caused by bombing, and the subsequent decline can probably be attributed largely to the rebuilding of these areas. Kestrels, too, appear to feed largely on House Sparrows *Passer domesticus* in Inner London and these have certainly decreased in this period (see page 225). Most of the nests of Kestrels in the last 15 years have been on buildings (including the Imperial Institute, the Savoy Hotel, St. Paul's School, Hammersmith and the B.B.C.); only in Battersea Park have trees been used (once a hole in a trunk and once the old nest of a Carrion Crow *Corvus corone*).

Gallinules (Rallidae)

The Moorhen *Gallinula chloropus* continues to breed in all the parks with 100 pairs, with a total population probably between 40 and 50 pairs. There is little evidence of any change, except in Regent's Park where Wallace (1961) noted an increase between 1947 and 1959 which continued until 1961. The Coot *Fulica atra*, first recorded nesting in 1826, was largely restricted to St. James's Park up to 1950, but has since spread—to Regent's Park from 1952 onwards; to Hyde Park and Kensington Gardens in 1953 and 1954, then regularly from 1957; and to Battersea Park from 1955 on. It is not known when it first nested in the garden of Buckingham Palace, but young were recorded in 1949 and there is now a small breeding colony established. At the same time, the breeding population in St. James's Park increased from a pre-1950 maximum of a dozen pairs to 28 by 1955, with many adults forced either into small territories with no hope of successful nesting or into the non-breeding flock. Control measures there have since brought the population to near its 1950 level, but the total Inner London nesting population is still almost three times the pre-1950 figure at about 30-40 pairs.

Gulls (Laridae)

The increases of all the five commonest species of gull as visitors to Inner London outside the breeding season were described in the earlier paper (Cramp and Teagle 1952). It then seemed unlikely that they would occur as breeding birds, but in 1961 and 1962 Herring Gulls *Larus argentatus* laid eggs in a nest near to the large sea-bird aviary at the Zoo, though without rearing young, and in 1963, when they were successful (Wallace 1964). Young were reared again in 1964 and at least one pair nested in 1965. As Wallace suggested, it seems likely that the presence near-by of a captive gull flock, fairly ready supplies of food and a well simulated breeding habitat were important factors, so it is interesting that in St. James's Park, where the last two requirements are also met, nest building occurred in both 1964 and 1965, though no eggs were laid. Further, in 1965 a pair of Lesser Black-backed Gulls *L. fuscus* stayed there during the breeding season, although without attempting to nest.

Pigeons (Columbidae)

This group now provides two of the three most numerous breeding species in Inner London. The Feral Pigeon *Columba livia* is neither recognised as a wild bird nor reported on, so no reliable estimate of its numbers can be given. Ecologically, however, it cannot be ignored. General observation suggests that it has increased markedly in the last

15 years; official control measures are helpless against strong affection and support from many members of the public. The only quantitative evidence available is based on the counts in the Bloomsbury squares from 1951 to 1965; these show a more than three-fold increase in the period. In 1951 the numbers of Feral pigeons in this area were barely one-sixth of those of the House Sparrow *Passer domesticus*; yet by 1962 they exceeded those of the smaller bird, and in 1965 were nearly 50% greater. The increase has paralleled the increase in numbers of people feeding them with bread or, more rarely, grain. Any nesting census is impossible, for, although nests on open ledges of buildings are not uncommon, the great majority are hidden. Nevertheless, it is felt that these counts of pigeons seen reflect changes in local breeding numbers, for it is probable that the Bloomsbury pigeons, like those in Hampstead (Gompertz 1957), rarely forage outside a radius of half-a-mile or so from their nests or roosts. The relative numbers of Feral Pigeons and House Sparrows differ in other parts of the area (Feral Pigeons are less numerous, for example, in areas with large gardens, such as St. John's Wood, and in some parks), but it is likely that by 1965 the total number of breeding Feral Pigeons had approached and may even have surpassed those of the House Sparrow, estimated at between 10,000 and 20,000 pairs (page 226).

The Woodpigeon *C. palumbus* is now the third most numerous breeding species in Inner London. Common and very tame before the war, its numbers were much reduced by shooting between 1939 and 1945, but by 1950 it had recovered something of its abundance but not its tameness. It is now as confident as ever and the steady growth in numbers since 1950 must have brought it up to or above its pre-war population. In the Bloomsbury squares a steady increase occurred until by 1962 average numbers were about five times those of 1950, since when there has been a slight decline. There are no precise pre-war breeding figures, but it is interesting that winter counts in Kensington Gardens in 1949 suggested that numbers were about one-quarter or one-fifth of those found in similar counts in 1925 (Cramp and Teagle 1950, Nicholson 1926), while E. M. Nicholson (*in litt.*) considers that the population in Battersea Park fell by a similar proportion between 1938 and 1945, recovering its pre-war strength by about 1956, and more than doubling it by 1964. In Regent's Park the Woodpigeon appeared to be still increasing in 1965. It is widely spread as a breeding bird, nesting in parks, squares and gardens, frequently in trees in busy streets and at times on buildings. Any estimate of breeding strength must be tentative, but it is probably now within the range of 1,250 to 1,750 pairs.

Against this, one species of pigeon, the Stock Dove *C. oenas*, has been lost as a nesting bird in the period under review. Before 1950 it

sted only in Kensington Gardens and perhaps the grounds of Holland House. It tried to nest in Battersea Park in 1950 and 1951 and proved to do so in 1952, when the first definite nest was also recorded in Regent's Park. In the next few years there were signs of further increase and spread, with probable breeding in Holland Park in 1955, nesting in Green Park in 1957, and occasional birds seen in Victoria Park and Bloomsbury. By 1961, however, the population had crashed completely, with no record anywhere of even an attempt at breeding, and since then the species has been only a very occasional visitor to Inner London. This abrupt collapse was almost certainly due to the use of persistent toxic chemicals in seed-dressings, which led to a marked decline of the species, especially in eastern and southern England, from 1957 onwards. The nesting birds seemed to feed mainly outside the Inner London area, and this may account for their being more affected by toxic chemicals than the much more sedentary Tawny Owls (see below). If the Stock Dove recovers following the restrictions on the use of such chemicals it may return to Inner London, and by then a fourth member of the group, the Collared Dove *Streptopelia decaocto*—so far only an occasional visitor—may have established itself as a breeding species.

Owls (*Strigidae*)

The only resident nocturnal predator is the Tawny Owl *Strix aluco*. Although this species has suffered elsewhere from toxic chemicals (Best 1965) and relatively small residues of three organochlorines and mercury were found in a Tawny Owl from central London (Cramp, Under and Ash 1964), there are few signs of any recent change in its numbers. Indeed, owing to increased observation, there have been more proved breeding records in recent years. Nests have been found in several of the parks (Holland Park, Regent's Park, Battersea Park, and Kensington Gardens and Green Park) as well as in squares in Bloomsbury and South Kensington. Some decline has, however, been observed in Chelsea in the last five years. The total breeding population is probably about six to ten pairs.

Beven (1965) has shown that the Tawny Owls in Holland Park feed largely on birds (93% of all prey units). Those most commonly taken were House Sparrows (27%), Feral Pigeons (17%), thrushes (probably chiefly Blackbirds *Turdus merula*) and Starlings *Sturnus vulgaris* (37% for the last two groups together, as they could not always be distinguished). Other prey species included Woodpigeon, Jay *Corvus glandarius*, Dunnock *Prunella modularis* and Greenfinch *Chloris chlois*. Mammalian prey, only 7% in Holland Park, rose to 10% in the inner suburbs at Stockwell, to 55% further out at Morden and to 90% on the outskirts at Bookham Common.

Swifts (Apodidae)

Definite nesting records for the Swift *Apus apus* are so few that it is impossible to assess either population size or trends. It apparently still breeds in small numbers in the western half of the area, with definite nesting records in the period from South Kensington, Notting Hill, Primrose Hill and Swiss Cottage, and a possible record from Regent's Park. As it has managed to cling on during the worst period of air pollution, it might increase in future with the spread of smokeless zones.

Woodpeckers (Picidae)

Between 1900 and 1950 the Great Spotted Woodpecker *Dendrocopos major* was the only known breeding species in this group. However, the Green Woodpecker *Picus viridis* was reported more frequently towards the end of that period and nesting was proved in Holland Park in 1952 and 1953, and may have occurred in 1954. There have been no subsequent breeding records, although a young one was observed in Regent's Park in August 1962. The Great Spotted Woodpecker, which was once restricted to the grounds of Holland House, spread after 1940, first to Kensington Gardens, where it bred in most years, and then to Battersea Park, where it probably nested in 1949 and 1950. Nesting was also attempted in Hyde Park and Ranelagh Gardens. Breeding was proved in Regent's Park in 1952 and probably took place in 1953 and 1954. The species has definitely nested there on only one occasion since (1961), although a juvenile was seen in 1960. In Kensington Gardens, where many old trees were felled in 1955, it has not been proved to nest since 1956 and it has gone from Battersea Park. It now appears to be once again confined to Holland Park, where a pair has bred or probably bred in most years since 1951. The origin of juveniles seen in Lambeth in 1960 and 1965 is unknown.

Crows (Corvidae)

The Jackdaw *Corvus monedula* has been just clinging on as a breeding species for many years. By 1950 the one colony in Kensington Gardens was very small, with no proof of breeding in some years. Since then, there have been frequent fears that the colony had become extinct, especially after the trees were felled in 1955. Between 1958 and 1962 there was not only no proof of breeding, but no birds were seen during the breeding season in some years. However, an attempt at nesting was made in 1963, and in 1965 one young Jackdaw, still unable to fly, was seen in the Gardens. No actual nests have been found for a number of years and the suspicion that the birds in the colony may sometimes nest outside Kensington Gardens was confirmed in 1962 when a pair was seen building in Stanhope Gardens, about half-

mile away. The Jackdaw may therefore perhaps still be counted as a breeding bird, with not more than three or four pairs.

By contrast, the Carrion Crow *Corvus corone* is thriving. It nests everywhere in Regent's Park and Hyde Park and Kensington Gardens, and more irregularly in other parks, such as St. James's, Battersea, Victoria and Holland Parks. It also breeds in many of the squares and open spaces, preferably those closed to the public, throughout the area, including several south of the Thames. Many nests are not reported, but attempts, only partially successful, at a full census in 1951 and 1957 revealed about 21 pairs and up to 25 pairs respectively. There are some signs of a slow increase in recent years and the total population is now probably between 30 and 50 pairs.

The Jay *Garrulus glandarius* was first suspected of nesting in Inner London in 1929. It bred for some years in the grounds of Holland House and then began to spread, so that by 1950 it was also nesting regularly in Kensington Gardens and Battersea Park, occasionally in other parks and sometimes in squares and even in trees in busy roads in Kensington. It now probably breeds or attempts to do so every year in Holland Park, Hyde Park and Kensington Gardens, and since 1957 in Battersea Park, in Regent's Park, and irregularly in St. James's and Green Parks. It has also nested in Ladbroke Gardens, Thurloe Square, Brompton Cemetery and probably in the Lambeth area. It has nested in holes in trees (*Brit. Birds*, 46: 113; cf. also 46: 98-99, plates 14-15) and, even more unusually, on buildings: after abortive attempts on the Foreign Office in 1951 and Lancaster House in 1952, another pair reared young in both 1964 and 1965 on a ventilator in the porch of a house in the Brompton Road, despite the heavy traffic roaring by. There are now perhaps 15 to 25 pairs breeding each year.

The Magpie *Pica pica* is increasing just outside the boundaries of Inner London (e.g. on Hampstead Heath) and has been recorded more frequently within the area in recent years. It may yet penetrate into the centre, as it has done in Dublin and some other cities.

Tits (*Parinae*)

Both the Blue Tit *Parus caeruleus* and the Great Tit *P. major* are recorded breeding regularly in all the larger parks, less frequently in the smaller ones, and in some squares and gardens. The smaller species is slightly more common, with perhaps between 60 and 90 pairs, against 10 to 75 pairs for the Great Tit. Both appear to have increased somewhat during the last 15 years. The Coal Tit *P. ater* is still an irregular visitor, but it has become markedly more frequent in the last 15 years. Though it was present in Kensington Gardens for a few years before 1950, there was only one definite breeding record, in 1947. Since then breeding has been proved in Regent's Park in 1951 and pairs have

possibly bred in or near this park in 1953, 1955 and 1965, while in Holland Park it has nested in 1958, 1959 and each year from 1962 to 1964.

Nuthatches (Sittinae)

In the autumn of 1957, when the large-scale irruption of tits occurred (Cramp, Pettet and Sharrock 1960), Nuthatches *Sitta europaea*, formerly no more than rare visitors to Inner London, were seen with flocks of tits in Kensington Gardens, Holland Park and Battersea Park. Some stayed on through the winter and in 1958 single pairs nested in all three parks, though the nest in Battersea Park was robbed. No further breeding was attempted there, but in Holland Park one to two pairs nested each year up to 1963 and perhaps in 1964, and a pair bred in Kensington Gardens each year, except 1961, until 1964. Odd birds were seen in both areas in the 1965 breeding season, but there was no evidence of nesting.

Creepers (Certhiidae)

The first breeding record for Inner London of the Treecreeper *Certhia familiaris* was in Kensington Gardens in 1945. It was thought to be established there in the years following, although proof was obtained only in 1952 and 1954. In the latter year, the nest was apparently robbed, and since then the species has been only an occasional visitor.

Wrens (Troglodytidae)

The Wren *Troglodytes troglodytes* has strengthened its position generally since 1950, when it was thought to breed in most years in Battersea Park, less regularly in Kensington Gardens and Regent's Park, and probably in the bombed areas of St. John's Wood. It now nests each year in Regent's, Battersea and Holland Parks (in the last-named it may have bred regularly before 1950) and the garden of Buckingham Palace, in most years in Kensington Gardens and occasionally in St. James's Park. Its numbers in St. John's Wood have declined with the rebuilding, but it may still nest there occasionally. A more surprising outpost was on the bombed area at Cripplegate, where a pair reared young in 1961 and 1962. The cold winter of 1962/63 appeared to have little effect on numbers (in Regent's Park a decline to six pairs from the 1959-60 peak of some 12 pairs occurred in 1962, before the cold spell) and the total present population is perhaps a little over 15 pairs.

Thrushes (Turdinae)

Another successful group in Inner London. In 1929 the Mistle Thrush *Turdus viscivorus* was restricted to a few pairs, mainly in the

nsington area but by 1950 it had increased and spread until it was breeding in most of the parks and some other open spaces with lawns. It now nests regularly in Regent's Park, Hyde Park and Kensington Gardens, St. James's and Green Parks, and Battersea Park, as well as in most years in Holland Park and the garden of Buckingham Palace. It also breeds each year in one or more squares in the western half of the area and is almost an annual nester in Bloomsbury now. Pairs have nested on a statue at St. Paul's School, Hammersmith, several times on popular scaffolding and once on a plane tree on an island in the busy Strand. The present population is probably 25 to 30 pairs.

The Song Thrush *Turdus philomelos* is still mainly restricted to the parks, but since 1950 there have been more records of nests in squares and gardens outside. It returned as a breeding bird to the Bloomsbury squares in 1958, after an absence of 18 years, and has nested several times since. Breeding has also been recorded in the St. John's Wood area, Brompton Cemetery, squares in the Notting Hill area, Lambeth and Kennington Park. In the past some decline has been normal after hard winters, but 1962/63 seemed to have little effect and by 1965 most of the large parks were reporting peak populations. The present breeding population is probably between 150 and 175 pairs.

The Blackbird *Turdus merula* has been even more successful. It is more numerous than the Song Thrush in all the parks for which census figures are available and is now found in squares, gardens and almost wherever there is a patch of green. A marked expansion in the period suggested by the colonisation of often marginal habitats and confirmed by counts in Regent's Park, Battersea Park and the Bloomsbury squares. In the last area the population has almost trebled since 1951 and the fierce competition for nest sites has led to Blackbirds building in drain-pipes, ruined walls and window ledges, in street lamps and even on the traffic lights at a busy junction. Similar sites have been reported from elsewhere, including several among the Cripplegate arches and one on the ground among daffodils in St. James's Park. The present breeding population is almost certainly in excess of 500 pairs and may be as high as 750 pairs.

The Robin *Erithacus rubecula* is much more restricted in its distribution, being still, as in 1950, virtually confined to the larger parks and open spaces and areas with larger gardens, such as St. John's Wood. There are no breeding records in the squares, although it occurs in the area as a winter visitor. There are, however, reports of increases in recent years in Regent's Park, Holland Park, and Hyde Park and Kensington Gardens, although Battersea Park numbers declined between 1950 and 1964. The present population is probably between 40 and 60 pairs.

In contrast, the Black Redstart *Phoenicurus ochruros* has declined

markedly since 1950. For many years after the 1940-41 blitz the devastated areas of central London, especially those around Cripplegate, were the main breeding headquarters of the species in the British Isles. The number of nests found has varied with the activity of observers, but it appears that the peak breeding population was reached in 1949 and 1950; thereafter there was a slow decline as rebuilding progressed, the number of known pairs falling from 13 in 1950 to three in 1963 (Fitter 1965). Even with construction going on all around and with their feeding areas reduced to isolated pockets, some birds hung on; in 1964 there was one breeding pair, and in 1965 a lone singing male, at the traditional Cripplegate site. Their tenacity is also shown by their willingness to make use of other weed-covered wastes: pairs bred in Paddington in 1958 and 1965 on areas cleared for building, and in Southwark in 1964. Others may well occur in areas little frequented by ornithologists, as was shown by the discovery in 1964 of two nests and several singing males in a heavily industrialised section of the Lea Valley just outside the eastern boundary of Inner London (Meadows 1965), and a breeding pair on a warehouse in Poplar in 1965.

Warblers (Sylviinae)

Except possibly in the private grounds of Holland House before the war, the warblers have never been able to find sites in Inner London with enough cover and freedom from disturbance for regular breeding. The sanctuaries set up in Holland Park and Regent's Park since 1950 do now afford a suitable habitat, if not always freedom from disturbance, and four species have attempted to make use of them in the period. The two which may have been regular nesters in the grounds of Holland House before 1939, the Blackcap *Sylvia atricapilla* and the Willow Warbler *Phylloscopus trochilus*, have been the most successful. Blackcaps are known to have bred in Holland Park in 1960, 1961, 1963 and 1965, in Regent's Park in 1965 (with an attempt in 1961) and, before rebuilding began, in the neglected gardens of St. John's Wood in 1953 and 1954; an attempt at nesting in Hyde Park was reported in 1961. Willow Warblers were proved to nest in Regent's Park in 1954 and 1955 and in Holland Park in 1953, 1958, 1959 and probably 1960. The first definite nesting of the Whitethroat *S. communis* in Inner London was recorded in Regent's Park in 1953 and a pair attempted to nest there again in 1956. In Holland Park a Whitethroat was seen carrying food in June 1960. The Chiffchaff *P. collybita* is equally rare as a nesting species: the last definite record was as long ago as 1937, though birds were present in the breeding season in Holland Park in 1958 and 1959 and may have nested in the former year.

Flycatchers (*Muscicapinae*)

The Spotted Flycatcher *Muscicapa striata* is one of the few summer visitors which breeds regularly. Its numbers tend to fluctuate, between probably ten and 20 pairs. Since 1950 it has nested annually in Regent's Park, in most years in Hyde Park and Kensington Gardens, St. James's and Green Parks, and Battersea Park. It has bred every year since 1959 in Holland Park, and in many years in St. John's Wood and Bloomsbury, as well as less frequently in Chelsea and Lambeth.

Centors (*Prunellidae*)

Up to 1950 the breeding distribution of the Dunnock *Prunella modularis* was similar to that of the Robin—in all the larger parks and open spaces, as well as in areas with large gardens, such as St. John's Wood, though it appears to have been slightly less numerous in these places. In the last 15 years it has not spread much beyond these areas, but it appears to have increased enormously in its main stronghold, Regent's Park, and noticeably in Holland Park and Hyde Park and Kensington Gardens. It has bred regularly in Battersea Park, St. John's Wood and probably in the grounds of Buckingham Palace, while there have been more frequent reports of nesting in St. James's Park and irregular ones from Chelsea and Kilburn. It has begun to penetrate squares in Bloomsbury and Westminster in recent years, though breeding has not yet been proved. In 1965 it was certainly more numerous than the Robin, with a probable breeding population of 100 to 120 pairs.

Wagtails (*Motacillidae*)

The Pied Wagtail *Motacilla alba* was known only as an irregular breeding bird before 1946, but from then on one or two pairs were recorded as nesting each year at Cripplegate and occasionally in the parks. Since 1950 it has almost certainly nested annually—in the early years on or near the City bombed areas and in most years since 1957 in Regent's Park, while the survey of the garden of Buckingham Palace from 1961 to 1964 showed that two pairs nested in each year, as they had probably done earlier. In 1961 nesting was established by the Houses of Parliament (after it had been suspected near this part of the Thames for several years) and in Holland Park. A pair bred at a Mayfair bomb-site in 1958. Present breeding numbers are probably up to three pairs and perhaps more in some years. More unexpected as a nesting species in the heart of London is the Grey Wagtail *M. cinerea*, yet it has reared two broods successfully on three occasions—at Cripplegate in 1952 and on Whitechapel brewery in 1960 and 1961.

Starlings (*Sturnidae*)

The Starling *Sturnus vulgaris* is still a common resident, breeding in

holes in buildings or trees in or near parks, gardens and most of the squares. This is a difficult species to census accurately and there are too few counts to show clearly whether it is increasing or decreasing, or to determine with any precision its present numbers. The counts in the Bloomsbury squares from 1951 to 1965 and in Battersea Park in 1950 and 1964 suggest a remarkably stable population over the period, but in Regent's Park a slight increase may have occurred in the last six years. In Holland Park it was apparently absent during the war years and in the early 1950's, but it returned fairly quickly after the grounds were opened to the public and now seems to have recovered its pre-war strength. As, in general, it occurs in the area almost wherever the Blackbird does and often, though not invariably, in smaller numbers in recent years, its present breeding strength may lie in the range 500 to 600 pairs.

Finches (Fringillidae)

Two finches, the Greenfinch *Chloris chloris* and the Chaffinch *Fringilla coelebs*, have been long established in Inner London. Before 1950 the Greenfinch was resident in small numbers in the larger parks and probably nested in St. John's Wood and Chelsea. Since 1950 it has bred regularly in Regent's Park, increasing in numbers in recent years; it is again nesting each year in Hyde Park and Kensington Gardens after being absent for many years in the 1950's; it has increased as a breeding species in Battersea Park and appears to be well established in the garden of Buckingham Palace. It probably nests in most years in St. John's Wood and Chelsea, and possibly also in Victoria Park. There have been a number of recent breeding records in Holland Park, and also in St. James's and Green Park. The evidence points to a marked increase in the last few years to a present breeding population of some 50 to 70 pairs.

The Chaffinch, successful in such a wide variety of habitats in Britain, is doing less well in urban London. It occurred in much the same areas as the Greenfinch before 1950, but was possibly slightly more numerous and widespread. Now the reverse appears to be the case. It has continued to nest regularly in Regent's Park and Hyde Park and Kensington Gardens, but has been lost as a breeding species in Battersea Park, and is irregular in St. James's and Green Parks. Small numbers have nested in most recent years in Holland Park and the same is probably true of Chelsea, St. John's Wood and Victoria Park. There are indications of a decline in total numbers breeding, which are now probably between 25 and 35 pairs.

The Goldfinch *Carduelis carduelis* is a relatively new arrival as a nesting species, but now appears to be established in small numbers. The first young were seen in Regent's Park in 1945 and breeding was proved in

attersea Park in 1949 and 1950. In the latter year young were seen in Victoria Park and Primrose Hill. Since 1951 the only known regular breeding area has been Regent's Park, but it may have nested in St. John's Wood in most years and was proved to do so in Holland Park in 1961. In 1951 it probably bred in Ranelagh Gardens, Chelsea, andrompton Cemetery, but there have been few observations from these areas since, or from Brondesbury where a pair was present in the nesting season in 1960. Total population perhaps five to ten pairs. In the winter of 1964/65 up to 105 Goldfinches roosted in plane trees on busy streets in South Kensington—apparently the first record of an urban communal roost of this species (Ruttledge 1965).

The Bullfinch *Pyrrhula pyrrhula* is a more recent arrival. It was first proved to nest in Regent's Park in 1959 and has bred there each year since, increasing slowly from one to three pairs.

The Hawfinch *Coccothraustes coccothraustes* has never been proved to breed in Inner London, although the evidence suggests that it may have done so in one or more years in Regent's Park or in the large gardens in the adjoining St. John's Wood area. Adults were seen feeding young in Regent's Park in 1951, 1952 and 1956, and carrying nesting material in 1954, and juveniles were recorded there in 1960 and 1962.

Sparrows (*Ploceidae*)

Several observers reported a fall in the numbers of the House Sparrow *Passer domesticus* in central London between 1900 and 1950. The only numerical evidence, however, was provided by a repeat winter census of Kensington Gardens in 1948/49, which showed that numbers were down by about two-thirds compared with a similar census made in 1925/26 (Cramp and Teagle 1950, Nicholson 1926). The most frequent explanation for the decline was the reduction in food supplies due to the almost complete replacement of horses by motor vehicles.

The regular counts throughout the year in the squares of Bloomsbury suggests that the decline has continued. Average numbers fell slowly but almost steadily in the years 1950-65 to only 39% of the initial figure. No satisfactory explanation for this is apparent. The only avian predators are the Kestrel and the Tawny Owl; the former has decreased and the latter seems to be stable. Cats have, if anything, tended to decline in numbers. There is no shortage of nest sites in the area; many suitable ones in use in the early 1950's are now untenanted. Horses ceased to be an important source of food before 1950 and supplies of bread, the sparrows' stable diet now, have increased during the period. It is true that competitors for bread, the Feral Pigeon, the Woodpigeon and, to a lesser extent, the Blackbird, have all increased markedly in numbers during these years, but observation suggests that supplies of bread continue to exceed the demand throughout the year.

almost everywhere in the district. Summers-Smith (1963) discussed a number of possible reasons for the decreases in House Sparrow populations in many parts of its range, and suggested that in large cities the decline in human residential populations in the central areas is an important factor. This is probably true of some parts of central London (e.g. the City), but in Bloomsbury there has been no such decline between 1950 and 1965.

Breeding censuses in 1950 showed a density of 4.3 birds per acre in Bloomsbury and 4.0 birds per acre in Lambeth (Homes *et al.* 1957). In the springs of 1945 and 1949 Nicholson (1951) found that surveys in Battersea Park, in his view an exceptionally favoured area, indicated a density of some five sparrows per acre; in 1964 he estimated (*in litt.*) that the density was about 2.75 birds per acre, a drop of nearly 50%. These central London figures were easily the highest densities found in a wide variety of habitats in Great Britain (Summers-Smith 1963). With a decline of some 61% indicated by the regular counts in Bloomsbury, density there must now be down to about 1.7 birds per acre and if a similar density applied over the whole of Inner London the breeding population would be just over 21,000 pairs. Observation suggests, however, that, although certain special areas, such as Covent Garden, may reach a higher figure, there are many other areas (e.g. the closely-built parts with few gardens or trees, the private squares and most parks) which have a much lower density. It may be hazarded, therefore, that the total House Sparrow population of Inner London is now between 10,000 and 20,000 pairs with the true figure probably being nearer the lower limit.

CHANGES IN THE BREEDING SPECIES 1951-65

In 1950 there were 32 species breeding or attempting to breed each year in Inner London. This total was made up of 20 species which were believed to have done so regularly from 1900 (Mallard, Mute Swan, Moorhen, Feral Pigeon, Woodpigeon, Tawny Owl, Swift, Carrion Crow, Great Tit, Blue Tit, Mistle Thrush, Song Thrush, Blackbird, Robin, Spotted Flycatcher, Dunnock, Starling, Greenfinch, Chaffinch and House Sparrow); four others which were probably regular nesters in this period (Great Spotted Woodpecker, Jackdaw, Wren and Little Grebe); and seven which became regular breeding species after 1900, most of them after 1925 (Jay, Goldfinch, Pied Wagtail, Black Redstart, Kestrel, Tufted Duck and Coot), plus the Stock Dove, which is probably in this category (see Cramp and Teagle 1952 for details). By 1965 four more species had been added to the list of regular breeders (Canada Goose, Pochard, Herring Gull and Bullfinch), with a possible fifth (Nuthatch). Two species had been lost (Little Grebe and Stock Dove) making the 1965 total 35 species.

Some of these changes can be readily explained. Both the Canada Goose and the Pochard were introduced, the former through the release of full-winged birds and the latter by the introduction of caged ones whose full-winged descendants increased and spread. The Herring Gull (forecast as a possible future nesting species in Homes *et al.* 1957) had increased as a winter visitor from about 1929 onwards, and its transition to a breeding bird was undoubtedly helped by the special conditions, including the presence of caged gulls, at the Zoo. The Nuthatch was mainly an accident of the 1957 tit irruption, after which a number stayed on to nest; it appeared well-established in small numbers until 1965 when, though still present, no proof of breeding was obtained. Only the Bullfinch seems to reflect a general increase of the species elsewhere, leading to its extension into more marginal habitats. Of the two losses, the Little Grebe was already, by 1950, restricted to the garden of Buckingham Palace as a nesting species and changed conditions there seem to be the most probable reason for its disappearance. The Stock Dove, however, again reflects the general trend—the decline caused in many areas of southern and eastern England by the use of persistent chemicals as seed-dressings. Before 1957, when these chemicals began to be used on a large scale, it was increasing and spreading in Inner London; then, within a year or two, its numbers collapsed dramatically and it disappeared.

In the preceding section some attempt was made to assess how the populations of the 30 species which bred regularly during 1951-65 had varied in these fifteen years. Eight species (Moorhen, Coot, Tawny Owl, Jackdaw, Spotted Flycatcher, Pied Wagtail, Chaffinch and Goldfinch) showed no signs of any marked change and to these should probably be added the Starling, although reliable evidence is limited. For the Mallard and the Swift available details are too scanty to provide any clear indication, but the remaining 19 species all seem to have changed in numbers, in some cases markedly, between 1951 and 1965. Of these, twelve species appear to have increased (Tufted Duck, Feral Pigeon, Woodpigeon, Carrion Crow, Jay, Wren, Mistle Thrush, Song Thrush, Blackbird, Robin, Dunnock and Greenfinch) and two others (Great Tit and Blue Tit) may have done so, while only five species have declined in numbers (Mute Swan, Kestrel, Great Spotted Woodpecker, Black Redstart and House Sparrow).

Changes in the environment may offer some explanation for a number of these increases and decreases. Inner London perhaps alters less than many areas, but in these 15 years there have been some important changes. The most marked has been the rebuilding of the extensive bombed areas, which began to make real progress by about 1955, and by 1965 was almost complete. The disappearance of these open spaces, rich in insect life, was undoubtedly the major factor in the

decline of the Black Redstart and probably caused the slight fall in the number of nesting Kestrels. Similarly, the rebuilding of St. John's Wood extinguished a small local population of Blackcaps and may account for the fewer observations of Hawfinches with young in Regent's Park in recent years, although this species has also declined on Hampstead Heath, the nearest definite nesting site to Inner London.

Many of the trees in Inner London were planted between 1750 and 1850. As they grew larger and older, a number of species benefited; these included the woodpeckers, with the Great Spotted increasing and spreading after 1928 and the Green nesting for the first time in 1952 and 1953. More recently some of these trees have had to be felled, including a major felling in Kensington Gardens in 1955 and some clearing in Holland Park in the 1950's. The Great Spotted Woodpecker has decreased, the Green has not nested again and the Treecreeper, which bred in Kensington Gardens for several years between 1945 and 1954, is now only an occasional visitor. In Kensington Gardens nest-boxes were provided to help the Jackdaws; they have not been used and the few pairs which struggle on seem at times likely to be nesting outside the park.

Insectivorous birds find conditions difficult in Inner London because the variety and numbers of insects and other arthropods are limited. Few insects can flourish on the buildings which cover much of the area, whilst elsewhere lack of variety of food plants and atmospheric pollution are inhibiting. Since 1950 measures to lessen atmospheric pollution, including the provision of extensive smokeless zones, have had some success; the emission of smoke in the London area decreased by about 60% between 1953 and 1963, although the use of fuel-oil in industry and of coal and fuel-oil in power stations led to a 32% rise in sulphur emission. There have been no studies yet to indicate how this has affected the number or variety of insects in Inner London, but it is interesting that several wholly or partly insectivorous species breeding there show an increase in the last 15 years. These include the Robin, Wren and Dunnock, and possibly the Great Tit and Blue Tit, whilst three occasional breeding species have tended to nest more frequently—the Coal Tit, Blackcap and Willow Warbler. For the Blackcap and Willow Warbler, however, a safe breeding site may often be the decisive factor. Both were thought to be annual nesters before the war when the wooded grounds of Holland House offered privacy and much of their recent success is due to the provision of sanctuaries in Holland and Regent's Parks. The largest of these is the woodland area in the north of Holland Park, wisely provided by the London County Council in 1952. This helped to increase the variety of breeding species there, once the initial disturbances were over, from between ten and 17 each year during 1952-57 to between

2 and 25 during 1960-63 (Brown 1963, 1964). The Blackcap and the Willow Warbler have nested there on a number of occasions and the Whitethroat and the Chiffchaff may have done so. The smaller sanctuary in Regent's Park has attracted both nesting Blackcaps and Willow Warblers, as well as the first definite breeding record of the Whitethroat for Inner London.

There has been a marked increase in the supplies of one food, bread, during the last 15 years. In the parks, squares and some quiet streets, there have been more people bringing more bread more frequently, and there has probably been an increase in this and other food on bird-tables in private gardens. In the Bloomsbury area, and probably elsewhere, this has been a major factor in the increases in the Feral Pigeon and the Woodpigeon, and to a lesser extent the Blackbird, while in the parks it may have helped the waterfowl, including the Canada Goose and the Tufted Duck. That other factors are involved in the increase of the Blackbird is also suggested by the increases in two other thrushes, the Mistle Thrush and the Song Thrush, which feed on bread to a much lesser extent. There has been little or no increase in the area of lawns in the parks and squares; these are important for all three species, as well as the Starling, which appears to have shown little change. There are indications in some areas that more young Blackbirds succeed in fledging now than pre-war, probably because there are fewer cats; this may also have helped other species. There is no obvious reason for the growth in numbers of nesting Carrion Crows, Jays and Greenfinches, whilst the puzzling slow decline of the House Sparrow was discussed earlier. The slight drop in Mute Swan numbers may reflect a similar fall in the London area generally, but more probably the species has, like the Coot, been actively discouraged on some park waters.

One change in an important Inner London habitat has had little obvious effect so far. The largest stretch of water, the Thames, is still heavily polluted, but there has been some improvement in the dissolved oxygen content of the water in recent years, and there is now a possibility of a few fish returning even to the central reaches. As a study of two lengths of the river in 1951-53 showed, the main bird species using the river are scavengers—five species of gulls, Mute Swans and Feral Pigeons, with smaller numbers of Carrion Crows, Mallards and House Sparrows (Cramp and Teagle 1955). Breeding species are severely limited by the lack of nesting sites along the river, though many Feral Pigeons nest under bridges.

THE PRESENT NUMBERS OF BREEDING BIRDS

Despite the limitations of the estimates of the numbers of breeding species outlined earlier, it is of some interest to summarise them in

BRITISH BIRDS

Table 1. Approximate numbers of pairs in 1965 of the species which breed regularly in Inner London

The Swift is omitted because the population is unknown, but it is unlikely to exceed 50 pairs and is possibly much less

1-5	6-25	26-50	51-100	101-500
Mute Swan	Canada Goose	Tufted Duck	Great Tit	Mallard
Kestrel	Pochard	Moorhen	Blue Tit	Song Thrush
Herring Gull	Tawny Owl	Coot	Robin	Duncock
Great Spotted Woodpecker	Jay	Carrion Crow	Greenfinch	(3)
Jackdaw	Wren	Mistle Thrush	(4)	
Nuthatch	Spotted Flycatcher	Chaffinch		
Black Redstart	Goldfinch	(6)		
Pied Wagtail	(7)			
Bullfinch				
(9)				
501-1000	1001-2000	2001-5000	5001-10,000	10,001-20,000
Blackbird	Woodpigeon	—	—	Feral Pigeon
Starling	(1)	(0)	(0)	House Sparrow
(2)				(2)

broad categories (table 1). This shows how the comparative richness of the breeding avifauna is dependent on a few areas, for, of the 35 regularly nesting species, 22 are represented by less than 50 breeding pairs (probably 23, for the Swift almost certainly comes into this group also). Noticeable also is the large gap between the two most numerous species, the Feral Pigeon and the House Sparrow, and the next commonest species, the Woodpigeon and the Blackbird, partly accounted for by the fact that in the closely built areas, especially to the east and south of the river, the former are the only species at all common. The total breeding population of birds in Inner London is now likely to be between 23,000 and 45,000 pairs, of which these two species make up the great bulk (87%-89%), with the remaining 33 species accounting for between 3,200 and 4,600 pairs.

The overall breeding density is thus between about 0.9 and 1.75 pairs per acre, or between 18 and 35 *birds* per 10 acres. This is still rather above the estimate given by Fisher (1941), for the average density of land birds in Great Britain as a whole, of slightly more than 20 birds per 10 acres and, although less than that of such habitats as orchards, allotments and parkland, it is higher than that of moorland, coniferous forests and most types of farmland. Any overall density is, of course, somewhat misleading, for there are certainly considerable variations between the different habitats in Inner London. Few precise figures

are available yet, but Wallace (1961) found that in 1959 there were between 19 and 22 birds per ten acres in most of Regent's Park, and 17 to 19 birds per ten acres in a larger area of the Park and Primrose Hill, with certain areas abutting. The Bloomsbury area of houses and squares probably has a much higher density of about 45 to 50 birds per ten acres, with Feral Pigeons and House Sparrows contributing heavily, but the highest known density so far has been found in the gardens of Buckingham Palace, with 61-79 birds per ten acres in 1961 and 1963 to 88 birds per ten acres in 1962 (Cramp and Spencer 1964). Here sparrows and pigeons are of little importance and the high numbers of other species are almost certainly due to the fact that their nests are almost free from disturbance.

NON-BREEDING SPECIES 1951-65

There has been little apparent change in the numbers or status of the main winter visitors to Inner London in the period, and gulls and ducks remain the most important of these. A great deal has been learned about migrants in the area, but these discoveries have been discussed fully by D. I. M. Wallace in Homes *et al.* (1964). This intensive watching has proved that a number of species shown in the 1900-51 list as irregular or rare on passage are now of much more frequent occurrence and in many cases annual. It has also helped to add a further 15 species to the 157 species recorded as having occurred in Inner London from 1900 to 1950. These are: 1951, Black-eared Wheatear *Oenanthe hispanica* and Greenshank *Tringa nebularia*; 1952, Merganser *Anas quequedula*, Stone Curlew *Burhinus oedicnemus* and Leach's Petrel *Oceanodroma leucorhoa*; 1958, Manx Shearwater *Puffinus puffinus*, Little Ringed Plover *Charadrius dubius*, and Reed Bunting *Emberiza caesia*; 1961, Firecrest *Regulus ignicapillus*; 1962, Corn Bunting *Emberiza calandra*, Pink-footed Goose *Anser brachyrhynchus*, Montagu's Harrier *Circus pygargus* and Collared Dove *Streptopelia decaocto*; and 1965, Osprey *Pandion haliaetus* and Grasshopper Warbler *Locustella naevia*.

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Wallace read the first draft, and their comments and criticisms have been of great value.

SUMMARY

An account is given of the species breeding in the 40 square miles of Inner London between 1951 and 1965, with particular reference to past and present status and estimated populations. Other species occurring are discussed only briefly.

By 1965 there were 35 species breeding or attempting to breed each year in Inner London, compared with 32 in 1950. Five new species were the Canada Goose *Branta canadensis*, Herring Gull *Larus argentatus*, Pochard *Aythya ferina*, Bullfinch *Pyrrhula pyrrhula* and, possibly, Nuthatch *Sitta europaea*, while the Little Grebe *Podiceps ruficollis* and Stock Dove *Columba oenas* had been lost.

Of the 30 species breeding regularly from 1951 to 1965, twelve appeared to have increased (Tufted Duck *A. fuligula*, Feral Pigeon *C. livia*, Woodpigeon *C. palumbus*, Carrion Crow *Corvus corone*, Jay *Garrulus glandarius*, Wren *Troglodytes troglodytes*, Mistle Thrush *Turdus viscivorus*, Song Thrush *T. philomelos*, Blackbird *T. merula*, Robin *Eritbacus rubecula*, Dunnock *Prunella modularis* and Greenfinch *Carduelis chloris*), as possibly had two others (Blue Tit *Parus caeruleus* and Great Tit *P. major*), while five had declined in numbers (Mute Swan *Cygnus olor*, Kestrel *Falco tinnunculus*, Great Spotted Woodpecker *Dendrocopos major*, Black Redstart *Phoenicurus ochruros* and House Sparrow *Passer domesticus*). The remainder had either changed little or the evidence is insufficient to reach any conclusion.

Possible reasons for some of these changes are discussed, including the rebuilding of bombed areas, the felling of old trees, changes in atmospheric pollution, toxic chemicals, the provision of sanctuaries, and increased food supplied by the public. In some cases, no obvious factor is apparent for the changes which have occurred, one of the most striking of which is the steady and continuing decline of the House Sparrow.

An attempt is made to assess the present numbers of breeding birds in Inner London. The overall density is probably now between 18 and 35 birds per ten acres. Two species, the Feral Pigeon and the House Sparrow, make up nearly 90 per cent of the total, while 23 of the 35 regular breeding species are probably each represented by fewer than 50 breeding pairs. The few census results available show considerable differences in the densities in the various habitats.

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PLATES 36 and 37. Opposite, Black Woodpecker *Dryocopus martius* at larger hole
 pine, Sweden, showing the 'hammer-head' effect of the erectile crest, the pale eye
 and bill, and the 'tripod' stance. Above, the male at the other nest and, below,
 close-up of two young, the sexes already separable (photos: M. D. England)



PLATE 38. Male Black Woodpecker *Dryocopus martius*, Sweden, his red cap coming to a point at the rear; note the grip of his toes on the bark. The thin wall of the hole emphasises the size of the cavity which may be ten inches wide and two feet deep—big enough for some ducks and owls to nest in (page 238) (photo: M. D. England)



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Studies of less familiar birds

140. Black Woodpecker

By Geoffrey Beven

Photographs by M. D. England

(Plates 35-38)

THE MALE Black Woodpecker *Dryocopus martius*, the size of a Rook *Corvus frugilegus* and almost entirely black with a crimson crown, makes an impressive sight in the tall coniferous and beech forests of continental Europe. The crown narrowing to an erectile crest at the back of the head gives the bird its characteristic 'hammer-head' appearance, which is well shown in plates 35 and 36, as also are the conspicuous eye (actually sulphur-yellow) and the pale beak. The under-parts are brownish and some individuals have dark brown on the primaries; the feet are bluish-grey. The length is about 18 inches and the weight 10-11½ ounces (out 285 to 325 grams). In the female the crimson is restricted to a

patch on the nape and, as seen in plate 37b, the difference in the extent of the crown colour in the sexes develops while the young are still in the nest.

HABITAT AND RANGE

The characteristic habitat is mature coniferous forest with an abundance of tall pines in the northern and mountainous regions of Europe and Asia, but further south this woodpecker also occurs in mixed forests and thick beech woods with old trees. In northern France there has recently been some colonisation of smaller pine and broad-leaved woods surrounded by much cultivated open country (Guichard 1961). Being perhaps the shyest of the woodpeckers it prefers the larger, quieter forests and seems to require a large territory; one pair occupied about 370 acres of mixed forest in the Netherlands, while three pairs each needed about 400 acres of mixed beech, oak, larch and pine in Germany (Eygenraam 1947, Sielmann 1959).

Having a Palearctic distribution in boreal and temperate climate zones, the range of this species was once almost continuous across Asia to the Atlantic shores of Europe, but is now probably broken up by deforestation (see Voous 1960). It breeds in the larger coniferous forests up to the Arctic circle in Norway and to the forest limits in Finnmark, extending across Sweden, Lapland and Finland through the Baltic Provinces, Poland and east Prussia to north-west Russia. During the second half of last century it spread from the hill forests of southern and central Germany to new pine plantations in central and western Europe, colonising Belgium in 1908 and the Netherlands in 1915. There has been a remarkable increase in the Netherlands since then, following the spread of beech and pine forest in quite flat country. However, it is still only a scarce winter visitor to Denmark.

In France the Black Woodpecker is found in the Alps and Jura ranges and extends south to the Pyrenees and the mountains of northern and central Spain. In the last few years it has been found spreading northward in France, into the departments of Yonne and Aube, bringing breeding birds to within 200 miles of the English Channel (Sautereau and Courtillot 1961, Guichard 1961). The range also extends through the alpine districts of northern Italy eastwards to the Balkan countries, Asia Minor, the Caucasus and southern Caspian region, leaving an isolated population in Calabria in southern Italy. Geographical variation has been discussed by Voous (1961).

Adults are sedentary, but young birds sometimes wander and one has been found 350 miles from where it was ringed (Cuisin 1963). Small numbers occur regularly on passage on the German coast; near Oslo in autumn some often move from coniferous to deciduous woods and elsewhere in Norway have even been found wintering in old barns.

BLACK WOODPECKER STUDIES

STATUS IN BRITAIN

ter (1959) has reminded us that during the first half of the 19th century the Black Woodpecker was accepted as a rare vagrant to Britain, but that in 1871 'J. H. Gurney's summary in the fifth volume of Dresser's *Birds of Europe* completely discredited its British status in the eyes not only of almost all contemporary ornithologists . . . , but of most later ornithologists as well'. Yet, according to Fitter, no other species not on the British list has so often been recorded wild in Britain. He has collected 17 records, including nine general statements, 17 specimen records and 17 sight records which he considers there is no specific reason for doubting. In his view, seven records are unassailable, these being three specimens from Dorset, Wiltshire and Yorkshire and four sight records from Hertfordshire, Brecon, Nottinghamshire and Cheshire (Fitter 1959 and *in litt.* 1966).

Some wandering of young birds in the autumn does occur so there seems no reason why one should not occasionally reach Britain. In Norway, a melanistic Green Woodpecker *Picus viridis* might cause confusion, but Sage (1962, 1963) did not include this species in his lists of recorded melanism in British birds and has since confirmed (*in litt.*) that he has never heard of a completely melanistic Green Woodpecker (though partial melanism has been reported once). Few Black Woodpeckers have been kept in captivity, chiefly because of their ability to break out of anything but the strongest metal structures; although it is known that several have been released in Britain, it is therefore unlikely that many of the records are of escaped birds.

VOICE AND HABITS

During the winter the Black Woodpecker remains quiet and is seldom noisy, but in the spring it becomes noisy and conspicuous. The main vocal sounds are (i) a very loud, plaintive, mellow whistle *kleea* or *lee-oo* repeated several times, reminiscent of the cry of a hawk and carrying far in the stillness of the great forests; (ii) a high, grating, rattling *kerri-kerri-kerri* . . . , recalling the chuckling cry of the Great Spotted Woodpecker *Dendrocopos major* but less harsh; (iii) a strident, grating *choc-choc-choc* or *quee-quee-quee* resembling the laughing cry of the Green Woodpecker but slower, shorter and usually uttered in flight; (iv) a *pee-ack* call similar to the cry of a Jackdaw *Corvus monedula* and apparently used only when a mate is near-by; (v) a *tuuk-tuuk* heard only during courtship; and (vi) soft cooing sounds, possibly signs of heightened excitement.

Drumming can be heard from the end of January in the Netherlands, and further north perhaps not until March. It may be frequent in the early part of the year before the male finds a mate; Sielmann (1959) found that at this season one individual might drum as often as 600 times

a day. On the other hand, Eygenraam (1947) found territorial behaviour to be poorly developed in that males in the Netherlands drummed only 30 times a day at the utmost, while drumming by females was even less frequent. He also noted that intruding Black Woodpeckers were not chased away, whereas Morris (1870) described the pair as extremely unsociable, a third individual being immediately driven away at all times of the year. The drumming is loud and often made on dead branches when it is said to be audible at half a mile, but we have occasionally observed drumming on metal objects, for example on the metal caps of telegraph poles in Sweden. Sielmann showed that, when extraordinarily excited, the rate of drumming rose to ten bursts a minute; each burst consisted of 35-44 blows with the beak, and lasted between 2.1 and 2.69 seconds (that is about three times as long as the Great Spotted Woodpecker's, and because of the heavier beak it is in a lower key). When the birds are paired and have begun to bore their nest hole, the spate of drumming tails off, but may not cease until the young are fledged.

While brooding the young, a bird will sometimes hammer against the side of the nest cavity, and Sielmann believed this to be an invitation to its mate outside to take a turn of duty. Similar communication has been noted in Chestnut-bellied Nuthatches *Sitta castanea* nesting in an aviary belonging to M. D. England, who has also found that Great Spotted Woodpeckers and Wrynecks *Jynx torquilla* frequently knock on the side of the nest hole, but in these instances he suggests that 'sawdust' may be brought down, thus helping nest sanitation. This is certainly so in the case of the Kookaburra *Dacelo gigas* which, in a nest box with a very large entrance, has been observed deliberately to bury the excreta of the young in the wood dust of the nest, after eating what it could reach (England 1944). Sielmann also saw a young Black Woodpecker striking its tongue against the side of the nest hole with amazing force and rhythm, thus producing a drumming noise, and he concluded that it was trying out the tactile and prehensile qualities of the tongue.

The flight of the Black Woodpecker is heavy, noisy and usually gently undulating. The action is peculiar, the bird opening its wings very widely and well extended in front, and beating them with long sweeps recalling the flight of a Jay *Garrulus glandarius*. While clinging to trees this species commonly goes downwards tail first for three or four feet, lifting the tail before each movement. When on the other side of the tree its progress can often be followed by hearing the sound of the claws on the bark, or perhaps it will peep round the trunk suspiciously to see if all is well. On occasion it climbs to the top of a tall fir and drops like a piece of black crepe to the lower part of another tree.

When displaying, the male or female may turn its back on the partner and stretch out its neck to demonstrate the red area. On other occasions

pair may each perch across a branch, facing each other and make wing movements with the upper part of the body, the bill describing a wide circle reminiscent of the movement of a conductor's baton. The female often takes the initiative in premating ceremonies and also in sexual copulation.

FOOD AND FEEDING

Throughout the year the Black Woodpecker finds most of its food in decayed stumps and logs, chiefly of pines. It eats large wood-boring insects and their larvae and also spiders, but feeds mainly on a big forest ant (*Camponotus herculeanus* which is not a native of Britain, the wood ant *Formica rufa* and the large black ant *I. fusca*, especially the first-named which in autumn may entirely fill the stomach of one of these birds. The young may also be fed largely on these three species of ants. Other food taken includes gnats, butterfly larvae, snails such as *Patula niderata*, *Physilia plicatula* and *Helix lopicida*, also rowanberries and bilberries. In the spring this woodpecker is known to drill holes through the bark of trees, sometimes encircling the trunk, in order to drink the fresh sap (Liard 1958).

Wood ants are taken from their ant-hills which the bird has an uncanny ability to locate, even when they are buried as much as three feet under snow in winter. *Camponotus herculeanus* also makes nests by tunnelling in decayed wood of stumps and trees; the Black Woodpecker catches these ants and other insects with heavy blows of the bill held tightly open, causing large chips of bark and wood (up to 23 cm. long) to fly into the air and litter the ground round the stumps. In this way rectangular holes may be excavated, measuring perhaps 23 cm. by 8 cm. and 9 cm. deep. Although these stumps may be extensively bored by insects the wood can be very hard and by no means rotten. Insects are extracted by the tongue which is like a hardened stiletto with many horny barbs at its tip. This harpoon-like instrument is used to spear insect larvae and pupae inside their chambers. Considerable penetration is possible because the tongue connects with the hyoid apparatus with its two horns of bone and elastic tissue that curve up over the back of the head, then join to become fixed in the right nostril, leaving the left one free for breathing. This arrangement forms a kind of pump which makes retraction of the tongue exceedingly rapid, while contraction of muscles attached to the hyoids thrusts out the tongue, which is two or three times the length of the beak and can be projected several inches, although it is not usually extended more than two inches (Tomson 1964, Sielmann 1959).

Experiments have shown that this bird can not only detect whether ants are present merely by 'rubbing its tongue' over a log, but can also locate the ants so accurately thereby that it can excavate down to the

hidden prey through layers of perfectly sound wood free from burrows (Callegari 1955).

BREEDING

The hen is said by Sielmann to choose the nesting area and remain there in subsequent years, whereas the male may change to another territory the next year (the paired adults remain together from January until after breeding). The male, on the other hand, chooses the site for the nest hole. After starting a number of holes he flies up to one and repeatedly looks inside and out again, and by forward movements of the head offers it to the female for inspection.

The nest holes are bored into the trunks of large trees which are often perfectly sound, which makes this species unpopular with some foresters. In Scandinavia the trees are usually pine or spruce, but tall decaying poplars are often chosen and nests are sometimes found in lime, birch and willow. Apart from plate 36, showing a nest in a pine, the accompanying photographs were taken between 8th and 20th June at Ackkär, southern Sweden, at a nest hole ten metres up a large alder. This tree was one of a small group of alders on the shore of a lake surrounded by spruce and birch forest. Telegraph poles or electric pylon poles made of pine may be excavated for nesting and are often protected by a covering of wire netting. Further south in Europe a large beech is most frequently used, preferably without branches below the hole.

The hole is always oval with the vertical dimension greater, usually measuring 11-12 cm. (but up to 17 cm.) in height and 8-11 cm. in breadth. The cavity is excavated to a depth of 37-60 cm. and may be 19-25 cm. wide. In Scandinavia the entrance hole is usually between six and ten metres above the ground but can be up to 25 metres, while in Germany Sielmann found most nests to be above ten metres. The hole usually faces north-east, but sometimes east or south-west, and serves as a roost and refuge in foul weather. Old nest holes have been used by Red Squirrels *Sciurus vulgaris* and as nest sites by Goldeneye *Bucephala clangula*, Smew *Mergus albellus*, Goosander *Mergus merganser*, Kestrel *Falco tinnunculus*, Stock Dove *Columba oenas*, Tengmalm's Owl *Aegolius funereus*, Hawk Owl *Surnia ulula*, Swift *Apus apus*, Roller *Coracias garrulus* and Jackdaw *Corvus monedula*.

The sexes share equally in the task of excavating the nest hole until the last week when the male may work alone. Although they carry the chips as far away as they can, some accumulate at the foot of the tree. When the hole is large enough the male roosts there, and when excavation is complete, after 21-23 days, the birds try not to leave the hole unoccupied. Jackdaws not infrequently occupy the hole unless one of the woodpeckers happens to be inside. The nest hole is readily deserted even after the eggs are laid, but if undisturbed these birds will return to

same hole for several successive years. Some small chips are left as g for the nest.

The eggs are usually laid one each morning near the end of April or in May (France and Scandinavia). The most frequent number is five to six but there are occasionally less; only one egg is exceptional and no more than nine have been recorded. They are a smooth glossy white and in any case measure 33-39 mm. long and 25-28 mm. broad. In shape they are more rounded and less elongated than those of the Green Woodpecker (Morris 1875).

The incubation period is normally 16 to 18 days and most of the incubation and care of the offspring is said to be done by the male (Eygenraam 1947), although Sielmann found that the sexes relieved each other every 70 to 90 minutes during this time. The fledging period is from 24 to 28 days (Bannerman 1955) and until almost the last day the male sleeps with the young in the nest (Eygenraam).

When the nestlings are very small and still blind and naked, their beaks are tipped with white and the ends of their tongues are brightly coloured. These markings probably facilitate the finding of the youngsters' beaks by the parent in the darkness of the hole. The adult at this stage must push the swelling at the side of the young bird's beak before it will be able to accept the regurgitated food; the adult, which is hanging its head downward, then thrusts its beak far down the nestling's throat. In feeding, the parent taps each nestling's hindquarters to stimulate defecation (Sielmann 1959); at the nest we observed only the male was able to enter the hole and to fly off with the faeces, sometimes taking as far as 100 metres.

The nestlings soon acquire greyish-black down and they open their eyes on the twelfth day. By the fifteenth day the feathers are sufficiently developed for young males to show red on the top of the head (plate 37b). The nestlings call more or less continuously a loud *teek-teek-teek* and from the twentieth day onwards they fight for positions at the entrance of the hole; they are said to be less noisy than the young of Great Spotted Woodpeckers, but even so they are audible at a great distance. They are fed every 90 minutes or so until 20 days old and then more frequently. On leaving the nest the youngsters spend the first few days in the open before they find a suitable hole for roosting and during this period they are no doubt particularly vulnerable to attacks by the Hawk *Accipiter gentilis*, their most serious predator.

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Firecrests breeding in Hampshire

By Michael C. Adams

INTRODUCTION

IN EACH OF the last six years, from 1961 onwards, Firecrests *Regulus ignicapillus* have been found in the New Forest, Hampshire, during the

breeding season. In two of these years, 1962 and 1965, they are known to have nested successfully in one locality. A brief reference to the earlier records and to the 1962 nesting appeared in Edwin Cohen's *The Birds of Hampshire and the Isle of Wight* (1963), but no details have otherwise been published and the aim of this short paper is to summarise the data so far collected.

The breeding records in 1962 and 1965 are almost certainly the first for Britain. A nest was stated to have been found in Lancashire in June 1927 (*Ibis*, 1927: 732-734), but this observation was subsequently viewed critically by H. F. Witherby who, without actually rejecting it, made it clear that he considered the evidence unsatisfactory (*Brit. Birds*, 197-198). Later, both *The Handbook of British Birds* (1938-41) and the most recent B.O.U. *Check-List of the Birds of Great Britain and Ireland* (1952) did no more than mention it with evident reservations.

For obvious reasons the actual localities in the New Forest must be suppressed and so they are referred to here by letters. Locality A, the area where breeding has twice been proved, has produced singing Firecrests in each year from 1961 and during the period I have recorded the species there on about 70 occasions. Usually I have visited the area on my own, but on three days in 1961 C. R. Tubbs came with me and saw singing Firecrests; K. H. Palmer has also visited the locality on at least one occasion in each year, and in 1962 had several interesting encounters with these birds. Locality B is several miles away and most of the observations there have been made by M. A. Stewart; others who have seen and heard the birds in that area include Robert Dunn, K. T. Landring and myself. Localities C, D and E are all within a two-mile radius of Locality A: they are the three places in which I found additional Firecrests during a search of about a dozen new areas between mid-April and mid-June 1965.

Although there are a few winter records of Firecrests in the New Forest (see *Hampshire Bird Reports*), I have been unable to establish that they spend the winter in these breeding areas and so the nesting population may be summer visitors. In support of this suggestion, I should mention that in 1963, 1964 and 1965 I failed to find Firecrests on a number of occasions in early spring, but located them quite readily on subsequent visits from late April onwards. In 1966, on the other hand, I heard the first ones in song at Locality A as early as 21st March and 3rd April (see page 244). It is more difficult to establish when the birds leave and my 'latest' records for each year are probably meaningless since, with song output diminishing from June onwards, the birds become increasingly difficult to find.

HABITAT

My experience to date indicates that the Firecrest in the New Forest is

usually found in mature mixed woodland where conifers, perhaps particularly spruce *Picea spp.*, are dominant. However, conifers are almost absent from some of the localities and the species may even have bred at one place which is dominated by oak *Quercus spp.* and beech *Fagus sylvatica* with a little holly *Ilex aquifolium*. At almost all the sites except in the mainly deciduous areas Goldcrests *R. regulus* occur in close proximity, but I have not noted any tendency for the two species to associate.

1961

OBSERVATIONS BY YEARS

Locality A. Recorded on 16 dates from 9th May to 25th June, with a maximum of four, including three singing males, on 10th May.

1962

Locality A. Recorded on about 30 dates from 14th April to 13th October, with a maximum of six singing males on 20th June (K. H. Palmer) and five on 21st June.

On the evening of 2nd July, at a site where I had previously heard a singing male, I found an adult Firecrest (probably a female) feeding at least four or five juveniles among some young conifers. I watched them at ranges down to ten feet and had a particularly good view of one juvenile as it preened. My notebook states: 'It was generally like a rather dull adult (fully grown in appearance), but there was no trace of any gold on the crown; there was a suggestion of characteristic eye-stripes but not clear-cut lines as in an adult . . . and a tinge of brighter colouring on the shoulders.' The juveniles were unconcerned but very noisy, persistently calling with a short *zit* like that of an adult. After 20 minutes I left and returned about an hour later with C. R. Tubbs. We searched for an hour or so until dusk without finding any sign of the family although we did locate a singing male a short distance away.

On five subsequent visits I was able to find only one or two singing males until on 20th July I came upon a pair with about six young at a spot 300 yards from the place where I had seen the family on the 2nd. For almost an hour I watched both parents feeding the young high up in some conifers and, although observation was not easy, I was again able to see the rudimentary eye-stripes of one juvenile which descended a spruce to a height of about 20 feet. All the birds were calling insistently and the male also sang intermittently. The following morning I readily found the adults again and for one and a half hours I watched them catching small moths and other insects and feeding at least two young high up in a spruce. At least one of the juveniles was also foraging for itself and again I saw its eye-stripes clearly. On one occasion the male, singing fitfully, dropped to the ground a few feet from me and caught a small moth which it carried back to its young in the canopy.

On 13th August I found at least four Firecrests working through some dense holly at another site where one or two males had sung fairly frequently since they were first located on 5th July. I am not certain that a family party was involved, but I think it highly likely and the insistent calling again seemed to suggest this.

1963

Locality A. One or two only recorded on five dates from 3rd May to 23rd June.

1964

Locality A. Recorded on nine dates from 30th April to 8th July, with a maximum of seven singing males on 22nd May.

Locality B. Recorded on eleven dates from 17th May to 19th July. The Firecrests in this locality were first found by M. A. Stewart and Robert Dunn who saw two singing males and also a female food-begging. On 28th June they watched a pair apparently carrying nesting material, but there were no other observations to suggest breeding. Firecrests were also seen at this site on several occasions by me.

1965

Locality A. Recorded on ten dates from 20th April to 4th July, with a maximum of three singing males on 30th May.

On 20th June, at the site where I had twice seen family parties in 1962, I came across a pair of Firecrests which were obviously at a nest and apparently feeding young. The nest was at a height of about 60 feet in a Douglas fir *Pseudotsuga taxifolia* surrounded by a variety of coniferous and deciduous trees. The nest itself was impossible to see, so dense and pendulous was the foliage around it, but its approximate position six feet from the tip of a branch 18 feet long could easily be assessed by watching the movements of the male which regularly sang from a tree near-by and then slipped quickly and directly to the nest. The female was much less easy to observe and approached the nest from the dense interior of the canopy. The pair usually left the nest simultaneously, but never in the same direction, after a stay not exceeding half a minute. Visits to the nest took place every few minutes, but I found it extremely difficult to see whether any food was being carried because it presumably consisted of minute insects and the conditions of observation necessitated the near vertical use of binoculars. At one point the male Firecrest was singing near the nest when a Goldcrest appeared suddenly. The Firecrest immediately attacked the latter and grappled with it whereupon the two birds dropped slowly earthwards in a fluttering bundle, separating only as they touched the undergrowth. Churring angrily the Goldcrest then flew off and the Firecrest resumed singing.

Several further visits confirmed that young were still being fed in the nest, but on 1st July I could see no Firecrests there at all. Then on 4th July I came across three juveniles with their parents close to the tree where the nest was and for one and a half hours I watched them at ranges down to 15 feet. The young had a downy, just-out-of-the-nest appearance and still showed pinkish gapes, but the distinctive though rudimentary eye-stripes were already a good feature. The female alone fed the young on this occasion while the male sang intermittently from trees near-by and did not associate closely with the family group.

I did not visit the area again until 12th September when I obtained the empty nest. It was constructed mainly of green moss interwoven with small quantities of hair and spiders' webs and was lined with small feathers. Its external diameter was about $3\frac{1}{4}$ inches and depth about 2 inches; the cup was approximately $1\frac{1}{2}$ inches wide and $1\frac{1}{4}$ inches deep. The whole was suspended from the underside of dense foliage by means of several twigs passing through the walls of the nest.

Locality B. Visited twice only and the sole record was of one singing male seen by K. T. Standing on 25th May.

Locality C. Visited only on 25th April when one was seen singing.

Locality D. Visited only on 2nd and 30th May when one was seen singing on each occasion.

Locality E. Visited only on 17th May when one was seen singing.

1966

Locality A. First records of one singing on 21st March and two singing and a third seen on 3rd April were much earlier than in previous years. Otherwise recorded regularly from 30th April onwards, with a maximum of eight singing males on 17th May and 12th June.

Locality B. No definite record in six or more visits from end-March to mid-May (M. A. Stewart, Robert Dunn).

Locality C. None seen in general area on 21st May.

Locality D. None seen on 7th May, but one singing on the 27th.

Locality E. Not visited to end of May.

SONG

Published descriptions of the song of the Firecrest vary somewhat and so the following notes may be of interest. To my ear the typical song is a little lower and stronger than that of the Goldcrest and is easily separable. It can be described as a tinkling repetition of a single high-pitched note gaining in volume and normally terminating in a flourish. Sometimes, particularly later in the breeding season when song output is diminishing, the terminal flourish is omitted and the song is then little more than an extended version of the *zit-zit-zit* call. During spells of

full song I have recorded a maximum output of eight songs per minute. Full song generally decreases from early June onwards although I have heard excellent song on many occasions after this time, particularly from new arrivals which have suddenly appeared in an area.

An extremely interesting but confusing song variation was noted in 1962 when two Firecrests at Locality A began singing an alternative song practically identical with that of a Goldcrest. On 12th May I had a baffling session trying to see a bird which by its song was one moment clearly a Firecrest and the next apparently a Goldcrest. However, it would not show itself in the dense canopy and the problem was still not resolved on 21st May when I found a Firecrest singing normally at the same site. On 27th May, however, after I had been searching unsuccessfully for Firecrests for over two hours, one suddenly appeared 30 feet above me in a pine and several times sang shortened versions (without the terminal flourish) of both its own song and that of a Goldcrest. On 12th June I again heard the double song this time from two individuals a short distance apart and I noted that the Goldcrest's version was 'quite indistinguishable, to my ear, from that of a Goldcrest, less the terminal flourish'.

On 17th June K. H. Palmer was with me and we had some uncommonly good views of a male low down in a young fir plantation. This bird gave a perfect exhibition of its typical song and also the Goldcrest song, this time complete with variable terminal flourishes. Simultaneously, another Firecrest was singing mainly the Goldcrest song from some mature trees near-by. K.H.P. visited the site again on 20th June and after listening to a double-singing Firecrest for some time, devised the following code for transcribing the sequence of the different songs:

- F = typical Firecrest song with or without terminal flourish
- G₁ = Goldcrest-type song *te-didi te-didi* . . . with no ending or single buzzy *tʒ* (rather variable)
- G₂ = Goldcrest-type song with well-marked double *tʒ-tʒ* ending (most typical)
- G₃ = Goldcrest-type song with *tʒeeoo-tʒ* ending like that of Marsh Tit *Parus palustris* (infrequent)

Using this code, K.H.P. recorded the following sequences on 20th June (no. 1), 21st June (nos. 2-5) and 22nd June (no. 6), accompanied by myself on the latter two dates:

- (1) G₃ G₂ G₂ FFF G₁ F F G₃ G₂ G₂
- (2) G₃FFFFF G₁F G₁ FF G₂ G₂ F G₂FG₂ FF G₁ F G₂ G₁ F G₁ FFF
- (3) G₂G₂G₂G₃G₂FG₁G₂G₂G₁F G₁G₁G₂F G₁G₂G₂G₂F F G₁F
- (4) G₂G₂G₂G₂F G₁G₂F G₁F G₁F
- (5) G₂G₂G₂ F G₁F G₁F
- (6) F F G₁G₂G₁

The site at which these events took place is not one at which the Firecrests are known to have bred although they may possibly have done so. Since encountering this remarkable variation in 1962 I have, of course, made a point of listening for it, but at no other time have I heard anything like it. The only other variation noted was a subsong which I heard at the same site on 26th June 1965 when an obviously anxious Firecrest just above my head in a holly uttered 'a soft warbling subsong incorporating a finch-like *tsweee* and a Goldcrest-like flourish'.

SUMMARY

Firecrests *Regulus ignicapillus* have occurred in small numbers in the New Forest, Hampshire, in each breeding season from 1961 onwards and a summary of the records is given. No less than five different localities have been involved, some of them several miles apart, but most of the observations come from one area (Locality A). In this area the breeding of at least one pair of Firecrests was established in 1962 (when newly-fledged young were seen) and again in 1965 (when a nest was found and later collected after the young had flown). With the possible exception of an old and not fully authenticated record in Lancashire, these appear to be the first instances of Firecrests breeding in Great Britain. Information is given on habitat and song, and a remarkable song variation in 1962 is described in detail.

Notes

Mute Swan with wooden spike through neck.—On 11th April 1966, at Sandwich Bay, Kent, I found an adult Mute Swan *Cygnus olor* with its neck transfixd by a wooden spike, possibly a bolt from a crossbow. This spike, about 18 inches long, three-eighths of an inch in diameter and very blunt, had pierced the neck at an angle about eight inches below the head and projected several inches on either side. Despite several attempts to capture it, the bird was quite strong enough to escape although it did not fly for more than 20 yards at a time and seemed to have some difficulty in breathing.

Recent notes (*Brit. Birds*, 58: 511-513) have referred to several species of birds surviving and leading fairly normal lives in spite of being impaled by sharp twigs or arrows. These included a Mute Swan with a long aluminium arrow through its neck (see Frank W. Lane, *Animal Wonderland*, revised edition 1962, plate 9). K. A. CHAPMAN

Great Skuas rolling on their backs while bathing.—I have read with considerable interest the several recent notes on geese, swans and ducks somersaulting during bathing (*Brit Birds*, 56: 190-191; 58: 58-60,

383-384; 59: 38), for I have observed what is perhaps comparable behaviour by quite a different species.

On 14th June 1964, at Loch Spiggie, Shetland, I was watching a party of 12-14 Great Skuas *Stercorarius skua* on the water in very good light. Most of them were head-dipping and wing-flapping in the manner commonly associated with bathing activities. After a while, however, I saw two of them turn over on their backs, their large webbed feet pointing skywards, and roll from side to side through an arc of about 60°. They remained in this position for 20-30 seconds, then righted themselves and resumed the more normal head-dipping and wing-flapping.

DAVID A. P. COOKE

[Although this behaviour does not seem to be mentioned in the standard text-books, a recent paper on 'The birds of Foula' by E. E. Jackson (*Scottish Birds*, 4: special supplement) referred to the way in which non-breeding or off-duty Great Skuas spend a great deal of time bathing and 'at almost any time of the day parties may be seen splashing, diving and rolling in the water'.—EDS.]

Herring Gulls trying to snatch fish from Great Northern Divers.—

On 26th March 1965, at Penzance, Cornwall, I watched six Herring Gulls *Larus argentatus* trying to take fish from three Great Northern Divers *Gavia immer*. A south-westerly gale had whipped the sea in Mount's Bay into a mass of breakers, but by keeping to the lee side of the breakwater the divers had found partial shelter and an apparent abundance of fish. The Herring Gulls were flying overhead and, whenever one of the divers momentarily brought a fish to the surface before swallowing it, one or more of the gulls would plunge down and try to snatch the food from the diver's bill. This behaviour continued intermittently throughout the half-hour that I watched, but the gulls were apparently unsuccessful during that time.

BERNARD KING

Kingfishers feeding on fish remains in garden.—In mid-January 1966, during a period of severe weather, most of the sheets of water in the vicinity of Corby, Northamptonshire, became ice-bound. On the morning of the 20th Mrs. P. Manning was surprised to see a Kingfisher *Alcedo atthis*, and then a second one, in her garden which is not far from where a tributary of the River Nene flows through the town. One of the Kingfishers hovered in front of a piece of suet suspended to attract tits *Parus spp.*, but was not seen to take any. Mrs. Manning happened to be preparing a meal of Herrings *Clupea harengus* and so she deposited the offal and also some uncooked strips of the fish upon a flat stone in her rockery, which serves as a bird table. Both Kingfishers took some of these fish remains then and again during the next two days, the 21st

and 22nd, on each occasion appearing at approximately the same time in the middle of the morning and eating just a few of the pieces. Presumably the same two were involved in each case and it seems likely that they were a pair although one always arrived before the other. A sudden thaw took place during the 22nd and after that they were not seen again. Mrs. Manning has kindly shown me some colour photographs of the birds in the garden and these confirm her identification.

N. L. HODSON

Prolonged aggression by Blackbirds towards another.—On 28th February 1965, in my garden at Reading, Berkshire, my attention was attracted by the behaviour of three male Blackbirds *Turdus merula*. The first was hunched up in a dejected attitude with eyes almost closed; the second stood about two feet away, looking aggressive but taking no action; the third was strangely rigid with body stretched forward and upward, head pointing almost skyward and beak open. This one moved slowly and stiffly round the first bird, gradually getting closer, always keeping an eye focused downward and backward on the crouching 'victim'; there was something strangely suggestive of a reptile about his movements. As I watched, he aimed a vicious jab with his beak at the middle of the other's back.

The victim made no attempt to avoid these attacks until I stepped forward, whereupon he fluttered towards me as the other two flew off. For a few moments I made no further movement and the two then returned, but my wife had joined me by this time and she picked up the injured bird without difficulty. We put him in a small cage and took him indoors where he revived. I carried the cage back into the garden and left it with the door open, but before I had moved more than a few yards the two attackers returned. Again I took the bird indoors and we transferred him to a larger cage for the night. The next morning we placed the cage in the garden once more, but, as the Blackbird hopped away, he was immediately set upon by three others, a female now having joined the two males. This time the victim literally ran back towards my wife and she returned him to the cage, but he seemed to have lost all spirit and merely huddled in his old dejected attitude with eyes closed. By the evening he was dead.

On examining the wound on his back I could not feel that this in itself was bad enough to have caused death. I can only think that he must already have been sick. Whatever the reason, it had provoked an attack that was remarkably vicious and prolonged. H. G. HAMBLY

[Dr. D. W. Snow, author of *A Study of Blackbirds* (1958), comments as follows: 'This record is interesting. I agree that the bird was probably sick in the first place, but it is a pity we do not know more about the

circumstances. I suppose that the excessive aggressiveness which seems to occur among garden Blackbirds is a result of abnormal crowding. Mr. Hambly's very apt phrase "strangely suggestive of a reptile" recalls H. Lambert Lack's paper on a regular communal display of Blackbirds which he observed in Sussex from February to April 1941 (*Brit. Birds*, 35: 54-57); there he described this stretched-up posture with its "curiously malevolent expression".—EDS.]

Blackbird swallowing part of dog's faeces.—On 15th March 1966, in a garden at Bristol, I saw a female Blackbird *Turdus merula* examining a dog's faecal mass, which was stale and almost white in colour. She picked up and swallowed a portion about one centimetre in diameter, and then flew off.

A. P. RADFORD

Review

The Technique of Wildlife Cinematography. By John Warham. Focal Press, London and New York, 1966. 222 pages, including 16 of monochrome plates. 42s.

'In this book I have tried to cover the special problems encountered when *shooting* motion pictures of *wild* animals . . . In scope the book is restricted to the filming of reptiles, mammals, and birds and, to a lesser extent, of insects . . . My approach here has been essentially a *practical* one.' These are the author's words, and the reviewer's italics.

Employing a clear and readable style, Mr. Warham gives us good advice early on about the choice of equipment and its use. He includes an ingenious chapter on the use of baits and lures, and a less original one on hides. The chapter on the problem of being an expedition ciné photographer is singularly realistic! The rôle of the motion picture camera in biological research is treated in a chapter headed 'Field Zoology'. There is a useful section on various forms of artificial light that can be employed. Mr. Warham has also taken account of the experiences, films and writings of others—a by-product of this being an original bibliography of some 73 references. There are nine pages of neatly executed line drawings, and 40 photographs (25 blown up from 16 mm. film frames).

Mr. Warham rightly castigates photographers (still and ciné) who elevate the photographic requirement above the welfare of the animal. But he seems to me to be unduly harsh with those who include in natural history films shots of captive animals, without specifically drawing attention to the fact (see *Scientific Film*, 3 (6): 110-113).

The author warns cameramen about putting themselves in their own films. Audiences, he says, 'do not mind a few shots of you in action, perhaps lining up the camera . . . but too many shots of this sort become irritating.' A polite understatement, I suspect. Wildlife films should be about wildlife, not about how wildlife films are made. There is a great need for books like the one under review, about how to make natural history films, and there is a crying demand for a film on the same subject. But shots of hide-building on cliff edges, and of chaps crouched impressively behind expensive equipment, such as are inserted regularly into animal films, are—again to put it politely—irrelevant.

Most wildlife film-makers are one-man bands. And each man plays better on some of his instruments than on others. To play well, and equally well, on each would involve a very rare combination of skills. Mr. Warham is strong on his zoology, strong on the photographic know-how, and strong on the practicalities of getting the shot. His only sins are ones of omission. There is a lack of emphasis on the artistic side: the initial subject selection; the devising of a dramatic story-line (an arresting opening, interest light and shade, and a good climax or at least a satisfying conclusion); expressive film grammar (a filmer is a sequence-builder, not a shot-taker); good title selection; opportunities for creative editing; and a balanced relationship between words and pictures. All these are legitimate considerations *right from the inception of the picture*, particularly in natural history filming, the one area where it is frequently impossible successfully to separate the rôles of cameraman and director—of technician and artist.

This book is thorough, enjoyable, and well illustrated. It takes a very large bite at the practicalities of how best to get nature in action and on to a screen. It is worth the two guineas it costs to anyone who has bought a ciné camera with animals in mind, and three to anyone who is contemplating doing so.

JEFFERY BOSWALL

Letters

Sight records of sea-birds

Sirs,—An observation by Dr. M. P. Harris (*Brit. Birds*, 58: 349-350) that exceptionally small individuals are occasionally seen among the population of Manx Shearwaters *Puffinus puffinus* on Skokholm, Pembrokeshire, has been followed by a further letter by Dr. C. M. Perrins and others (*Brit. Birds*, 58: 521-522) suggesting that some of the sight records of Little Shearwaters *P. assimilis* in recent years may arise from confusion with such runts and that they find it difficult to accept as adequately proved these and other recent records of rare sea-birds. Perhaps you

will allow me to comment on this issue, as one of the people who is asked to assess many of the records and who is personally acquainted with most of the observers and species concerned?

It appears to me that there has been an altogether unnecessary amount of mysticism over sea-bird identification, leading to excessive ideas of its difficulty. This has apparently been due mainly to attempts by authorities on land-birds to persuade people to identify sea-birds by the use of criteria successful ashore, such as the precise distribution of markings and the colours of soft parts. It is often difficult to see these things at sea and, if we were to depend on them for identifications, few sea-birds would be reliably determined. Identifications are usually achieved most quickly and reliably out at sea by attention to other characters, such as shape and behaviour. Neglect of this fact has resulted in such a poor knowledge of our sea-birds that, even some years after the war, individual records of large shearwaters from Ireland were being received with public scepticism (*Brit. Birds*, 47: 221) in a situation where within a decade we were to be confronted by repeated records of passages of hundreds of the same species seen by many people on several different occasions (*Brit. Birds*, 56: 189-190; 57: 200-202); and a film showing a good view of the rarest of them, Cory's Shearwater *Calonectris* diomedea*, has now been seen at many public meetings and on television.

In these circumstances it seems more reasonable to postulate that the numbers of our scarcer sea-birds sometimes present in our offshore waters are being underestimated rather than overestimated and that a good many species, such as the Little Shearwater, are considerably commoner than was previously supposed. The Little Shearwater is a very early nester and seems just as likely to disperse north after the breeding season as the western Mediterranean race of the Manx Shearwater *P. p. mauretanicus*, long ago shown by the late H. F. Witherby to be a regular visitor here in late summer (*Brit. Birds*, 15: 151-153). In point of fact, I can testify that quite exceptional care has been taken to verify at least the Irish records of rare sea-birds in recent years, including reference to several independent authorities, and that the majority of the more unusual ones have been rejected, so that those which appear in print are no more than the exposed part of a considerable iceberg of new information on status.

*At the beginning of 1966, in a search for uniformity, we adopted the nomenclature of Charles Vaurie's *The Birds of the Palearctic Fauna* (1959-65) and we therefore normally still place Cory's Shearwater in the genus *Procellaria*, while reverting to the separation of *Puffinus* for other species. However, Dr. Bourne has particularly requested the use of *Calonectris* here in view of the important statement by the late W. B. Alexander and 14 others, including Dr. Bourne, on 'The families and genera of the petrels and their names' (*Ibis*, 107: 401-405) in which the recognition of this additional genus for Cory's and closely related species is strongly advocated.—Eds.

In the case of the Little Shearwaters in particular, the acceptance of records has not been based on size at all (though these birds are so small that this is normally the thing about them which first attracts attention), but on accurate descriptions of their behaviour and especially of their manner of flight, which is sufficiently distinctive to attract spontaneous comment from all reasonably competent observers even in the absence of the descriptions to be found in all good textbooks. It may be argued that this distinctive flight, which I can confirm from personal experience, is a function of their small size and will be found in any small shearwater. However, it seems more likely to be due to the distinctive proportions of the Little Shearwater, which has a wing/tail ratio varying between 2.3 and 2.9 in different races (2.6 in our race *baroli*) as opposed to one between 3.0 and 3.4 in the races of the Manx Shearwater (3.2 in our race *puffinus*).

Furthermore, even if we exclude consideration of the flight and allow for the fact that size is very hard to judge at sea, it seems doubtful whether many Manx Shearwaters are quite as small as Little Shearwaters. S. M. Taylor and C. G. Bennett have been kind enough to examine the statistics of my own series of skin measurements, but find them hard to interpret because of the presence of considerable variation according to sex and possibly also to age. If this is allowed for, while it is possible that the extremes of normal variation might include birds as small as that reported by Dr. Perrins and his friends, perhaps at about the frequency they suggest, one in thousands, it seems more likely that they would be considerably less common. The fact that it was over a generation before they were commented on at Skokholm (though Peter Davis tells me they were noticed some time before they were reported), and that we have still been given the dimensions of only one young bird out of over 100,000 ringed there, tends to confirm this.

The final proof of the matter surely depends on the only objective evidence available, the specimen records. Although a vast number of black-and-white shearwaters must have been handled in the British Isles by ornithologists (I have seen scores of skins and hundreds of bodies myself), until now the only small specimens collected have been six undoubted Little Shearwaters, and nobody has yet produced a small specimen of a Manx, though if one occurred it seems likely that it would also attract attention as a result of attempts to identify it as a Little Shearwater. The single small Manx produced so far was found only as a result of the examination of thousands of birds at a breeding station by people presumably alert for such occurrences and, even so, there is still no evidence how much larger it would have been when fully grown, whether it would fledge successfully then, or what it would look like when fledged. If it did fledge successfully it seems unlikely that it would fly like a Little Shearwater at sea, in which case the record

would not have been accepted in recent years; and if it did fly like a Little Shearwater at sea, even on the basis of the specimen records alone it seems likely that real Little Shearwaters are much more numerous out there.

It is clearly time that new criteria were accepted for the recognition of birds at sea, which bear more relation to what sound observers may be expected to observe under normal conditions there. I should like to draw particular attention to the excellent descriptions of shearwaters, and the variations in their appearance under different viewing conditions, published by Dr. J. D. Parrack in the Tyneside Bird Club's Annual Report for 1963. If observers pay proper attention to the behaviour of the birds and the variations in their appearance with plumage-wear and viewing conditions in the ways described by Dr. Parrack, I feel that it is no more reasonable to doubt the better recent records of Little Shearwaters on the grounds that they might be small Manx, than it would be to question all the huge numbers of Great Shearwaters reported in the autumn of 1965 (*Brit. Birds*, 59: 88) on the grounds that they might be large Manx.

W. R. P. BOURNE

Five-year survey of Irish sea-birds

Sirs,—This summer sees the initiation of a five-year survey of the breeding sea-birds of Ireland. The survey is being organised as a preliminary trial under the auspices of the Seabird Group to start collecting data from a difficult area in preparation for a general census of the breeding sea-birds of Britain and Ireland in 1969. In the present case it is hoped, during the course of the five-year period, to plot the locations and numerical strength of colonies of the 22 breeding sea-bird species found in Ireland, in order to bring the information up to the standard available for the rest of the British Isles. Detailed plans for the full census will be announced later.

Meanwhile, I should like to hear from any of your readers who are planning to visit Ireland this summer, or indeed during any summer up to and including 1970. I shall be glad to supply them with further details of the survey plan if they care to write to me at 1 Corrig Park, Dun Laoghaire, Co. Dublin.

OSCAR J. MERNE

Requests for information

Influx of Great Shearwaters in autumn 1965.—September 1965 heralded one of the largest influxes on record of Great Shearwaters *Puffinus gravis* in British and Irish waters. The biggest numbers were seen off south-west Ireland, but it is apparent that the birds were widespread around our coasts. Also involved were many Sooty

Shearwaters *P. griseus* and very much smaller numbers of Cory's Shearwaters *Procellaria (Calonectris) diomedea*. At the suggestion of the Seabird Group and *British Birds*, A. Gibbs and R. G. Newell have agreed to collect all records relating to the distribution of these three species in the north Atlantic and western Europe during the summer and autumn of 1965 with a view to publishing a paper. Anyone who has records of Great, Cory's and Sooty Shearwaters for this period is asked to send them to **R. G. Newell, 55 Avonmore Road, West Kensington, London W.14.**

Swallows ringed in South Africa.—Last winter some 25,000 Swallows *Hirundo rustica* were ringed in South Africa by the South African Ornithological Society and it is hoped that some of these will be retrapped in Europe. The rings used have a number on the outside and the return address 'Zoo Pretoria' on the inside. As it is difficult to remove a ring from a live bird, ringers are asked to note that these South African rings can be recognised by the number on the outside. This consists of a prefix of three digits, which on the Swallows concerned has been 601 or 581, and a suffix of five digits underneath. A few Sand Martins *Riparia riparia*, Great Reed Warblers *Acrocephalus arundinaceus*, Marsh Warblers *A. palustris*, Sedge Warblers *A. schoenobaenus*, Garden Warblers *Sylvia borin*, Whitethroats *S. communis* and Willow Warblers *Phylloscopus trochilus* were also marked with similar rings. Anyone who traps or finds dead one of these South African birds is requested to write to **A. D. S. Hewitt, Witwatersrand Bird Club, P.O. Box 7048, Johannesburg, Republic of South Africa**, with details of ring number, species, date, locality with co-ordinates if possible, sex and age if known, condition, and whether released. Particulars of the ringing will be sent to the finder by return air mail.

News and comment

Edited by J. L. F. Parslow

Council of Europe awards for nature conservation.—The first awards of a 'European Diploma for Nature Conservation' have recently been made by the Committee of Ministers of the Council of Europe. The diploma, which is designed to encourage the effective protection and management of certain landscapes, reserves and natural features of outstanding interest, was instituted in 1965 on a proposal of the European Committee for the Conservation of Nature and Natural Resources. From over 20 proposals submitted by the 18 member governments, the three areas selected for the award in 1966 are the Camargue nature reserve in France (established as long ago as 1927), the Hautes Fagnes nature reserve in Belgium (established in 1957, and stretching over the high plateau of Baraque Michel in the Rhine massif), and the Peak District National Park in Derbyshire, where a special presentation ceremony, attended by officials of the European Council, was held on 29th April.

Among other proposals recently approved by the Committee of Ministers is the organisation of a European Nature Conservation Year in 1970, leading up to a conference to be held in Strasbourg. Other activities of the Conservation Committee include a campaign against the excessive use of pesticides and a survey of animals and birds needing special protection in Europe.

Bird protection in Speyside.—In view of the very considerable recent tourist developments in Speyside and on the neighbouring Cairngorms and their possible adverse effects on wildlife, the Royal Society for the Protection of Birds has appointed

a full-time representative for the area to keep a watchful eye on the situation. He is Wing-Commander R. J. Fursman, who for the past five years has supervised 'Operation Osprey', which will remain in his overall charge. As well as liaising with landowners, developers and other interested parties and generally putting forward the case for bird conservation, he will also be available to give local information to visitors. The day-to-day administration of the Loch Garten reserve will now be in the hands of the assistant warden, David Grant. At Loch Garten the Ospreys returned to the same nesting tree for the eighth successive year and began nesting in April. However, gale force winds on 28th April severely damaged the eyrie and three broken eggs were found on the ground below. Only the previous day, a second pair of Ospreys elsewhere had also suffered the loss of their eyrie—and its single egg—from a similar cause.

The Queen opens Wildfowl Trust research centre.—On 23rd April Her Majesty the Queen inaugurated a new research centre at the Wildfowl Trust, Slimbridge. The new building is on two floors, the upper of which includes a library, workrooms and offices. The ground floor comprises a fine lecture theatre and also incorporates the main entrance hall and permanent exhibition rooms, through which the Trust's many thousands of visitors will pass on their way into the New Grounds.

Untimely death of A. J. Clissold.—On 9th April 1966 A. J. Clissold was tragically drowned near his home in Northumberland while testing a new method of trapping Whooper Swans. He was aged 35. In recent years he had taken a leading part in three expeditions to Iceland devoted to ringing Whooper Swans during their moult.

Tony Clissold had been interested in ornithology all his life (writes Dr. Leo Kinlen) and he pursued this with an enthusiasm which was inseparable from whatever he did. Educated at Sedburgh School and Durham University, he afterwards farmed at Haydon Bridge in Northumberland. His farm allowed him little leisure and latterly most of his bird-watching had been done during holidays abroad. Friends who accompanied him on such trips know best how tireless he was in the field, but still more admired him for his cheerfulness which never failed even in the most depressing conditions. Never merely concerned in sharing his interest with others of similar experience, his commitment was much broader. He helped to organise nature trails for children, gave talks to schools and village groups, while various societies looked to him as their guide on any field meeting to the Northumbrian loughs. Besides doing some intensive work on swans and the Great Skua in Iceland and the Bluethroat in Spain, he had an extensive general knowledge of birds, and was also experienced in ringing, sound recording and photography, some of his work in these last two fields being of high quality. He is a great loss to amateur ornithology but still more to his many friends. Our sympathy goes out to his aunt and brother.

National nature reserves in Wales.—Announcements concerning new nature reserves and extensions to existing ones continue to arrive at a steady rate from the Nature Conservancy. Even though some may be of only minor ornithological importance, the continued establishment of new national nature reserves is of such general interest to all naturalists and conservationists that we make no apology for mentioning them here. The latest additions concern a new reserve in Merionethshire and extensions to two others in Wales.

The new reserve, comprising 194 acres of long-established oak woodland, lies in the Vale of Ffestiniog, near Maentwrog. It is the third and largest woodland reserve to be declared in this valley, but because of its southerly aspect and other features, its ground vegetation (mainly bracken) is markedly different to that in the other two. The future management of the reserve will be particularly concerned with regenera-

tion of the woodland. It will be under the supervision of a committee which will include representatives of the National Trust (from whom the reserve has been leased) and the North Wales Naturalists' Trust. Peter Hope Jones, formerly with the Nature Conservancy on Anglesey, well-known for his ornithological work there and previously on Fair Isle and elsewhere, has recently moved to Merionethshire to take charge of this and the several other reserves in the county.

The first part of the Snowdon National Nature Reserve was declared in 1964, and further agreements with two other landowners have now almost doubled its original size to 4,145 acres. The extension is an area of considerable geological and botanical interest, and includes the cwms between the summits of Lliwedd, Crib Goch and Snowdon itself, together with Llyn Llydaw and Glaslyn. The new reserve agreements will not affect public access for walking over the open country.

The first part of the Whiteford reserve in Glamorgan, comprising 344 acres of saltmarsh was also declared in 1964, and the recent addition of a further 1,589 acres of sand and foreshore now makes this one of the largest reserves in south Wales. The main interest of this area lies in its well developed sand-dune system and the associated flora. Large numbers of wildfowl, notably Wigeon and Teal, and including Pintail, Shoveler, Eider, Shelduck and Brent Goose, occur on the reserve during the winter months. Public access to the beaches and foreshore will not usually be restricted, though cars will not be allowed.

Oxfordshire nature reserve extended.—A further extension of 34 acres of grassland, including a small area of scrub, brings the Aston Rowant National Nature Reserve, Oxfordshire, up to 201 acres. This reserve, situated on Beacon Hill near the main A40 London to Oxford trunk road, includes a substantial area of beechwood, making up about half the reserve's total acreage. Most of the grassland will be used for research into the effects of sheep-grazing on chalk-downland plants, and access away from the public footpaths is to be restricted to permit holders.

Bird observatory courses.—Two courses, designed primarily for bird-watchers who already have some experience of ringing, are being conducted by the British Trust for Ornithology at Gibraltar Point Bird Observatory, Lincolnshire, in the late summer. Each course will have a slightly different emphasis. The first from 20th to 27th August, under C. J. Mead, will concentrate on mist-netting techniques, while the second from 27th August to 3rd September, under Robert Spencer, will be more concerned with the laboratory aspects of handling and ringing birds. The inclusive charge for each course is 8 guineas. Fuller details and application forms may be obtained from the B.T.O., Beech Grove, Tring, Hertfordshire.

Bardsey Bird Observatory, Caernarvonshire, is running several courses earlier in the summer on the theme 'Birds of an off-shore island'. Each lasts one week and is aimed especially at the less experienced bird-watcher. Leaders include William Condry, Anthony Harthan and the observatory's resident warden, George Evans. An inclusive charge of £11 9s. covers the cost of a week's board and tuition, and also the return boat fare and island landing fee. Further details may be had from Mrs. G. F. Walton, 51 Mount Road, St. Asaph, Flintshire.

Bird-watching in Yugoslavia.—Professor I. Tutman of the Biological Institute at Dubrovnik is anxious to make contact with British ornithologists who are interested in Yugoslavian birds. He has published a number of papers on birds in Yugoslavia, mostly in Serbo-Croat, though with full summaries in German. He also speaks English and has offered to give local information on birds to anyone visiting Yugoslavia, either to do research or merely on a bird-watching holiday. Anyone able to visit him at the Aquarium in Dubrovnik will receive a warm welcome. His address is: Professor I. Tutman, Biološki Institut, Dubrovnik, P.O. Box 39, Yugoslavia.

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Voluntary Wardens required to assist Resident Warden on Skomer Island. Apply General Secretary, West Wales Naturalists' Trust, Ltd., 4 Victoria Place, Haverfordwest, Pembro. S.

For sale. *British Birds*, vols. 30, 31, non-standard binding; also vol. 1 nos. 1-7 and 10-12, vol. 5 nos. 1-6, and various other odd parts. Wanted. *British Birds*, vols. 13-14, 17-21, bound or unbound. L. A. Pownall, 10 Carrwood Road, Wilmslow, Cheshire.

Experienced ornithologists invited to man Cap Gris Nez Bird Observatory in 1966. Apply Secretary, 53 Ember Farm Way, East Molesey, Surrey.

Calf of Man Bird Observatory, off the south-west coast of the Isle of Man, is open now and will stay open to mid-October. Persons interested in helping the Warden with the work there (ringers, mist-netters and other *bona fide* naturalists) will be welcome for periods of one week or longer. Hostel-type accommodation (camp beds, calor gas cooking, piped water supply and flush toilet) available at 4s. per night. Further particulars from the Secretary, The Manx Museum and National Trust, Douglas, Isle of Man.

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News and comment

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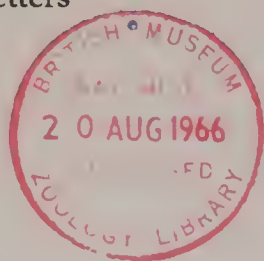
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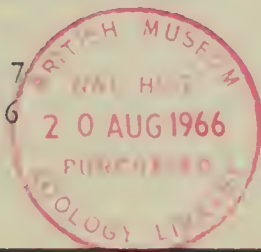
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British Birds

Vol. 59 No. 7

JULY 1966



The International Ornithological Congresses

By *E. M. Nicholson*

(Plates 39-49)

INTERNATIONAL CONGRESSES are such an embarrassingly flourishing feature of the world today that it is a question whether ornithologists should take pride or feel apologetic over having been among their earliest addicts. This year, for the second time in 32 years, we British ornithologists have been the hosts, and to those who can look back on the previous gathering in 1934, likewise at Oxford, it is sobering to reflect that the International Ornithological Congress had then already reached its half-century.

On that occasion the Congress emblem was, like that of *British Birds*, a Red Grouse, designed by G. E. Lodge, and it is interesting to recall that one new feature was a bird art exhibition, among the contributors to which, besides Lodge, were Archibald Thorburn and Peter Scott. There was also a bird photography exhibition and, as in 1966, a trip was organised to see some bird islands, the choice being Skokholm, Skomer and Grassholm, to which the Royal Navy provided transport in the destroyers H.M.S. *Wolfhound* and H.M.S. *Windsor* operating from Milford Haven, Pembrokeshire (plate 39). In view of the subsequent damage to these colonies through discharge of oil, it is worth recalling that this 8th Congress passed a well-drafted resolution calling for action to deal with the menace of oil pollution at sea and advocating the provision of separators in ships—a stage which it took nearly another thirty years to attain, even in part. The President was the distinguished Berlin ornithologist, Professor Dr. Erwin Stresemann (plate 44), now the senior surviving ex-President of an I.O.C., and the Secretary was that leading Oxford ornithologist of the time, the Rev. F. C. R.

Jourdain. It was a happy and successful Congress, despite the cloudy and anxious international situation, and by lucky coincidence it more or less synchronised with the effective launching of the British Trust for Ornithology and the Edward Grey Institute, and with other initiatives which excited a good deal of interest among the visiting ornithologists. Our founder, H. F. Witherby, took an active part in the preparations and among other things distinguished himself by a witty speech at the Congress Dinner. Among papers expressing the new experimental approach in field ornithology was one by our late colleague W. B. Alexander on homing experiments with wild birds. Of the 65 papers given, 30 were in English, compared with five out of 57 at Berlin in 1910.

Going back to the beginning, British ornithologists were virtually unrepresented at the first Congress in Vienna during 7th-14th April 1884 and the second at Budapest during 17th-20th May 1891. These Congresses, under the Presidencies of Dr. G. Radde and Professor V. Fatio, were less preoccupied with topics of ornithological study than with bird protection and ornithological politics. In that period, while Germany was consolidating as one of the leading powers, the ancient Hapsburg Empire was faced with the threat of disintegration into its component national territories, though this was actually postponed until the Treaty of St. Germain in 1919. The most restless and powerful of the rebellious territories was Hungary, but Hungarian support had been bought in 1867 by a strange bargain under which the Empire became a dual monarchy with one capital in Vienna and another in Budapest. The immediate result was to intensify rivalry between these twin capitals for their own empire-building within the Empire. It so happened that in Hungary there was intense interest in the economic aspects of ornithology, leading to the creation of a State institute for studying it. Migratory birds and their protection became a lively issue and, as the heir at that time to the imperial throne, the Archduke Rudolph, was a keen ornithologist, successful efforts were made to interest him in promoting an international conference on the subject. Unfortunately, in the course of the rather sordid intrigues and internecine feuding, it was Vienna, not Budapest, which won the struggle to act as host, and the problem was complicated by the tragic and mysterious death by shooting at Mayerling of the I.O.C.'s original royal patron, the Archduke. The original promoters, however, fell into such a mess after the Vienna meeting that Budapest was offered a second chance, which was taken in 1891, and, although the international scope of the meeting was still very limited, a basis was created for the wider Paris Congress of June 1900, and for the emergence of an entirely independent and self-sustaining movement. Perhaps the last and most picturesque survival of the Congress's somewhat

Ruritanian origins was the continuance in an honorary role of ex-King Ferdinand of Bulgaria, who, thinly disguised as Count Murani, officiated as a Vice-President at the previous Oxford meeting (plate 40a).

This evolution is perhaps best illustrated by the London Conference of 1905, when Dr. E. Oustalet was succeeded as President by R. Bowdler Sharpe, whose printed Presidential speech amounts to a catalogue of the bird collections of the British Museum (Natural History). There were now five sections:

- I Systematic ornithology
- II Migration
- III Biology, nidification and oology
- IV Economic ornithology and bird protection
- V Aviculture

The struggle between hobby or external applied interests and scientific ornithology, and within the latter between straight museum work and wider biological tasks, could hardly be better outlined. It was pointed up by a striking paper on 'The principal aims of modern ornithology' in which Dr. Ernst Hartert bravely and candidly exposed and condemned the various fashionable unscientific approaches, and argued, among other things, that we should protect birds, including predators, because we like to have them around rather than through specious arguments of their economic usefulness.

The lofty flights of ornithological discussion gave way to less lofty exhibitions in the field, when the Congress members made an excursion to Bridlington by special train and were given an opportunity of seeing the professional climbers at work in the seabird colony on Bempton Cliffs. 'Luncheon was served in a tent which had been erected near the edge of the cliff . . . Of the innumerable eggs brought up by the climbers many were bought and taken home to the cabinets of egg collectors, where they will for a long time remind their owners of the Congress of Ornithologists in 1905.' May this extract from the official proceedings remind us also that what Congress participants do in the field, and the way in which they do it, inevitably sets an example, good or bad, of accepted ornithological conduct.

In 1910 it was Berlin's turn, under the Presidency of Professor A. Reichenow, to develop further the solid ornithological content and function of the Congress, but unhappily owing to World War I there was not to be another until the 6th at Copenhagen sixteen years later, under the Presidency of Dr. Ernst Hartert, whose spanning in himself of the German and British ornithological worlds, and whose deep scientific scholarship peculiarly fitted him to restart the broken tradition. His success in this was demonstrated by the following Congress, only four years later, at Amsterdam in 1930 under Professor E.

Lönnberg (plate 40b), which in turn paved the way for the 8th Congress in Oxford in 1934 already mentioned.

The 9th Congress in Rouen in 1938 under Professor A. Ghigi (plate 44)—who to this day does not permit his advanced age to interfere with his world-wide ornithological travels—was notable among other things for the new prominence accorded to the film as a medium, including an early one on behaviour by Dr. Konrad Lorenz. The hospitality was formidable, in the best French tradition. In addition to two main film showings in the Normandy Cinema, the three hundred participants from 32 countries faced during the five days one reception, two garden parties, one evening illumination, one centenary celebration at the Jardin des Plantes, one *grande excursion* (all day), one simple excursion and, of course, one banquet to prepare them for the long post-conference excursion finishing on the Mediterranean coast in the Camargue (plates 40c, d and e), where, despite it being mid-May, the official account records unequivocally 'il pleurait à torrent'.

Again a bitter and prolonged interruption and the survivors met once more in 1950 at Uppsala (plate 41), instead of, as had been resolved at Rouen, in the United States in 1942. Most agreeably, however, Dr. Alexander Wetmore (plate 44) was able to fulfil his role as President on the other side of the Atlantic, and Professor S. Hörstadius (plate 43b) proved an outstanding General Secretary. Was Uppsala really the high point in the history of the conferences, or did it just appear so because there was so much to tell and discuss after so many cut-off years, and so much pleasure in meeting earlier friends again? Certainly the shaping of the agenda and the 'editorial' preparation helped a great deal to make this 10th Congress the ornithological feast which it was, while the diversity and riches of central Sweden and the impressive band of younger field men serving as guides made the field trips also most rewarding.

Basle in 1954 (plates 42-43) was the second Congress to have a British President, Sir Landsborough Thomson (plate 44), very ably backed by the Swiss General Secretary, Dr. A. Portmann. For the first time here the British Broadcasting Corporation was officially represented, indicating the great jump in importance of sound recording and the study of bird voices, which added another technological tool, as in effect did the now fully established colour film of birds in the field. Naturally in this location there was a very numerous attendance of German ornithologists.

With Helsinki in 1958 (plates 45-46) and Ithaca in 1962 (plates 47-49), under the Presidencies of Professor J. Berlioz and Dr. Ernst Mayr (plate 44), we come within such recent memory that we confine ourselves here to including these among our illustrations, and recalling by no more than a mention the big issue of the future character of the

Congresses. This was now raised by their embarrassingly expanding popularity, and by the incompatibility between the more austere needs of a scientific conference and the agreeable but diversionary activities which were becoming inflated by the demands of those who looked to the I.O.C. largely as a provider of guided field excursions and of entertaining films and exhibits. Much thought has now been given to these delicate and difficult issues and, following the promising results of trial changes at Ithaca, the new 14th Congress at Oxford embodied the outcome. In particular, this Congress was preceded by a bird islands cruise on which many of the participants found an excellent opportunity to get to know not only more birds and more islands but also more of one another before the Congress assembled. The switch to July also met the problem of field workers who were faced with losing a whole season's studies by the previous habit of assembling in May or June. An unplanned feature of the arrangements was, however, the coincidence of this gathering of ornithologists in Britain with that of many thousands of football supporters from many quarters for the World Cup, where the same need for an off-season date has arisen. Owing to their distinct ecological preferences, the two forms of the human species involved contrived to avoid clashing.

The role of weather, food and biological factors in timing the sexual cycle of Woodpigeons

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INTRODUCTION

THE AVAILABILITY of suitable food for feeding their young has long been considered an ultimate factor determining the breeding seasons of birds (Baker 1938, Lack 1950, Thompson 1950, Marshall 1951 and references quoted.) Nestlings hatched at inopportune seasons may fail

to fledge or, if they fledge, may suffer a disproportionately high mortality compared with those reared during the optimum season. Natural selection provides the means whereby only the gene complexes of appropriately behaving individuals are propagated and inappropriate reproductive rhythms become eliminated. The mechanisms which enable the gonads of different species to respond to environmental stimuli that synchronise breeding attempts to the relevant food seasons are similarly subject to selection. Marshall (1959) postulated that two sets of such environmental synchronisers orientate the endogenous reproductive rhythm, namely (1) accelerators and (2) inhibitors. These are antagonistic and the ratio of one to the other will determine whether the gametogenetic cycle is advanced or slowed down.

Rowan's (1929) epochal discoveries showed the important effect of photostimulation as an accelerating stimulus on the reproductive cycle in temperate zone birds (see reviews by Burger 1949, Farner 1959). He also demonstrated that temperature could effect gonad recrudescence. The importance of temperature in modifying the spring development of avian gonads leading to laying has subsequently been shown by many workers (Marshall 1949, Kluijver 1951, 1952, Lack 1958). Rainfall and associated factors, possession of a territory or suitable breeding area, the presence of predators, availability of nesting material, the food supply and various behaviour interactions following pairing, are all proximate factors which are capable of influencing the seasonal development of the breeding cycle (see review by Marshall 1959).

In the case of the Woodpigeon *Columba palumbus* it has been suggested that the food supply determines the amount of time that the pair can spend together in their territory and, by modifying the duration of intra-pair stimulation, regulates the timing of ovulation and laying (Murton, Isaacson and Westwood 1963). In those species which adapt their clutch and hence brood size to the food supply, some quantitative relationship linking the various proximate releasing factors and the birds' internal condition, leading eventually to ovulation by the female, must also be postulated. Woodpigeons habitually come into breeding condition in March because they are sensitive to the natural March daylength, or photoperiod, whereas Stock Doves *C. oenas* are more sensitive to photostimulation and therefore their gonads can respond to the increasing daylength of late January. Current work has shown that the Woodpigeon has no refractory period. This is a time, within the period of gonad regression, when for many other bird species appropriate environmental stimuli, particularly increases in daylength, fail to evoke gonad development. The refractory period functions as a safety mechanism and prevents such a species as the

Rook *Corvus frugilegus* from breeding in June and July when the day-length exceeds the stimulatory level necessary for full gonad development, in this case that of late February and early March.

Wynne-Edwards (1962) has recently suggested that conventional behaviour may be more important than generally acknowledged in regulating animal populations. In particular, the reproductive rate may not necessarily be the maximum that can be achieved and it may be reduced at times of high population density in anticipation of replacement requirements. Many of the supposed manifestations of self-regulatory mechanisms apply to relatively late stages in the breeding cycle, for example the reduced clutch size found by Kluijver (1951) to occur in the Great Tit *Parus major* at high population density (it should be mentioned that a different interpretation has been put on this observation by Lack 1951). More information on the inhibitory effect of high population density is available for mammals (for House Mice *Mus musculus* see Southwick 1955, Crowcroft and Rowe 1958; for Rabbits *Oryctolagus cuniculus* see Lloyd 1965). If individuals can modify their reproductive rate according to population density, it might be that some effect is apparent at earlier stages of the sexual cycle.

There is an enormous volume of literature on unseasonal, early or late breeding in birds as manifested by actual nest building or egg laying. But there is a paucity of data on the effects of environmental fluctuations on the actual sexual cycle. Thus, many of Marshall's (1951) views depended on information collected in only two contrasting seasons. As we have detailed information covering six years for the Woodpigeon, it seemed worthwhile examining which, if any, of the above mentioned factors might be important in regulating the annual sexual cycle of this species. A comparison of the gonad cycle with those of other European pigeons of the genus *Columba* has also been made (Lofts, Murton and Westwood, in press).

MATERIAL AND METHODS

The Woodpigeons used in this investigation were shot or collected by means of stupefying baits in and around a study area at Carlton, Cambridgeshire, about five miles south-east of Newmarket, Suffolk, during 1959-64. The reproductive condition was assessed by routine histological examination of the gonads. The spermatogenetic activity was classified as follows:

Stage 1 = 'Resting' testis with only a peripheral ring of undividing spermatogonia in the tubules

11 = Start of spermatogenetic activity; spermatogonial division occurring and a few primary spermatocytes sometimes present

III = Numerous primary and some secondary spermatocytes visible

IV = Spermatids present

V = Full breeding condition with all spermatogenetic stages represented, including spermatozoa

Ovarian development was assessed by measuring the diameter of the largest follicle. The state of oogenesis of each specimen was classified into one of three categories based on this measurement. When the follicle size was less than 2 mm. the bird was considered to be in a resting or non-breeding condition. Follicles between 2 mm. and 4 mm. were considered to represent birds undergoing recrudescence while a follicle size of 5 mm. or more represented the attainment of full breeding condition. Bartelmez (1912) claimed that the follicles of unmated pigeons never exceed 5.5 mm., but that the final growth to an ovulation size of 22 mm. can occur in about 8 days.

Meteorological data recorded at the National Institute of Agricul-

Table 1. Meteorological data from the National Institute of Agricultural Botany, Cambridge, for the periods during which Woodpigeons *Columba palumbus* were collected at Carlton, 13 miles away

	1959	1960	1961	1962	1963	1964
Mean monthly temperature in °C						
January	1.7	4.4	3.3	4.4	-3.3	1.7
February	3.3	3.9	7.2	4.4	-1.1	4.4
March	7.7	6.7	8.3	2.8	5.5	4.4
April	10.0	9.4	10.5	8.3	9.4	8.9
May	12.2	13.3	11.7	10.0	11.7	13.9
Mean hours of sunshine per day						
January	2.4	1.5	1.6	2.2	2.0	1.3
February	2.4	2.4	2.4	3.0	1.1	2.3
March	3.1	2.0	5.0	3.1	3.7	1.7
April	5.4	5.8	3.6	4.8	4.2	3.0
Mean numbers of days per week with ground frost						
January	5.8	4.3	6.5	4.5	7.0	6.3
February	3.5	3.0	1.8	5.0	7.0	5.0
March	2.4	2.2	3.8	6.0	3.2	3.8
April	0.8	1.3	1.0	1.3	2.5	2.5
Total rainfall per month in inches						
January	2.58	1.43	1.81	2.19	0.82	0.59
February	0.12	1.47	1.61	0.71	0.66	0.52
March	2.37	1.62	1.25	1.07	2.02	3.26
April	1.59	0.21	1.46	1.49	1.27	2.18
May	0.54	0.92	0.95	1.81	2.01	1.64

SEXUAL CYCLE OF WOODPIGEONS

Table 2. Spermatogenetic condition of adult (A) and first-year (B) male Woodpigeons *Columba palumbus* at Carlton, Cambridgeshire, during spring recrudescence

Dashes denote months in which no sample was available

Spermatogenetic stage (pages 263-264)	Number of birds in each category											
	1959		1960		1961		1962		1963		1964	
	A	B	A	B	A	B	A	B	A	B	A	B
January	I	4 3	13 2	13 8	10 -	7 -	2 0					
	II	4 0	0 0	0 0	0 -	1 -	6 2					
	III	0 0	0 0	0 0	0 -	0 -	0 0					
	IV	1 0	0 0	0 0	0 -	0 -	0 0					
	V	0 0	0 0	0 0	0 -	0 -	0 0					
February	I	4 6	10 -	18 17	4 -	3 -	3 1					
	II	3 0	6 -	4 4	5 -	5 -	4 7					
	III	1 0	0 -	3 0	2 -	0 -	0 0					
	IV	4 0	0 -	2 0	0 -	0 -	0 0					
	V	0 0	0 -	0 0	0 -	0 -	0 0					
March	I	0 3	0 -	0 0	1 1	0 -	0 0					
	II	0 0	1 -	1 8	3 2	1 -	2 1					
	III	2 0	3 -	4 2	4 0	1 -	6 0					
	IV	1 0	3 -	16 0	1 0	3 -	0 0					
	V	2 0	4 -	15 0	0 0	2 -	0 0					
April	I	- -	- 1	- 0	0 -	0 -	0 0					
	II	- -	- 1	- 1	1 -	0 -	1 3					
	III	- -	- 1	- 1	0 -	0 -	1 1					
	IV	- -	- 0	- 0	4 -	0 -	2 0					
	V	- -	- 0	- 0	8 -	8 -	4 0					
May	I	- -	- 0	- 0	0 0	0 -	0 0					
	II	- -	- 0	- 2	0 1	0 -	0 0					
	III	- -	- 0	- 0	0 1	0 -	0 1					
	IV	- -	- 3	- 3	1 0	0 -	0 1					
	V	- -	- 4	- 8	14 2	8 -	5 4					

tural Botany, Cambridge, 13 miles from the collection area, were kindly supplied by the Meteorological Office (table 1).

RESULTS

Summaries of the spermatogenetic condition of adult and first-year males and follicular size of adult females during the first five or six months of every year are given in tables 2 and 3. The seasonal changes in adult mean testis volume throughout the six-year study period are depicted in fig. 1.

Following a spring recrudescence of gametogenesis, males entered

Table 3. Ovary condition of adult female Woodpigeons *Columba palumbus* at Carlton, Cambridgeshire, during spring recrudescence

The figures in brackets following the totals for April, May and June give the percentages of birds which had follicles exceeding 5 mm. in diameter, there being evidence that follicle size does not normally exceed this unless the female is mated and receiving courtship stimuli from the male

Follicle size (in mm.)	Number of birds with follicles in each category					
	1959	1960	1961	1962	1963	1964
January						
under 2	6	22	16	31	10	7
2-4	2	3	0	4	2	3
over 4	0	0	1	0	0	0
Total	8	25	17	35	12	10
Mean (mm.)	1.1	1.2	1.1	1.1	1.5	1.7
February						
under 2	5	52	30	14	9	8
2-4	9	11	19	6	1	8
over 4	0	0	0	0	0	0
Total	14	63	49	20	10	16
Mean (mm.)	1.7	1.2	1.6	1.4	1.4	1.8
March						
under 2	0	13	2	3	3	1
2-4	8	16	44	11	13	5
over 4	0	0	3	0	1	0
Total	8	29	49	14	17	6
Mean (mm.)	2.9	2.1	2.9	2.4	2.8	3.2
April						
under 2	0	1	2	1	0	0
2-4	10	28	3	13	5	11
over 4	3	2	2	2	7	2
Total	13 (23)	31 (3)	7 (29)	16 (6)	12 (25)	13 (0)
Mean (mm.)	3.7	2.9	5.1	3.3	4.4	3.8
May						
under 2	0	0	1	0	0	0
2-4	14	14	58	6	4	0
over 4	7	3	10	6	8	11
Total	21 (14)	17 (6)	69 (3)	12 (42)	12 (50)	11 (73)
Mean (mm.)	3.8	3.7	3.3	4.3	6.9	5.6
June						
under 2	3	1	0	0	0	0
2-4	8	3	5	9	5	9
over 4	12	10	14	12	16	26
Total	23 (39)	14 (57)	19 (53)	21 (43)	21 (62)	35 (51)
Mean (mm.)	4.8	6.6	7.6	6.0	6.1	5.4

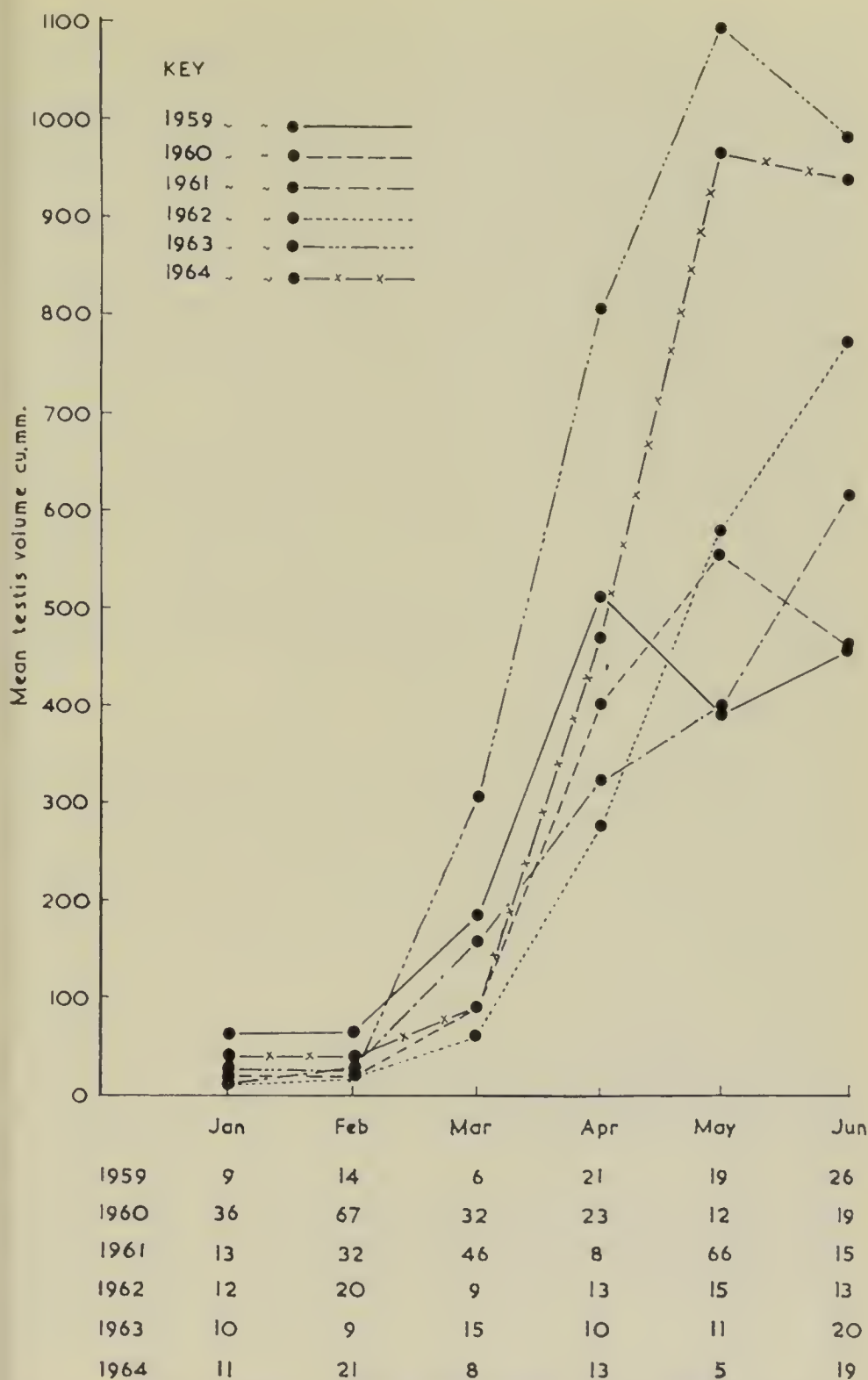


FIG. 1. Annual variations in the spring recrudescence of the testis of the Wood-pigeon *Columba palumbus*, judged by variations in mean testis volume. The numerals below the graph indicate the number of different birds contributing to each of the monthly means

their acceleration phase (Marshall 1959) and by June all the adults and most of the juveniles collected were in full breeding condition with their seminiferous elements proliferating spermatozoa. By July the juveniles, too, were uniformly in stage v of their spermatogenetic cycle. In the post-nuptial period the avian testis undergoes a rapid regression and reverts back to a stage i condition (Marshall 1959). In August only two out of 71 adults collected during 1961-64 had started such regressive changes and in September the figure was eight out of 35. In the Woodpigeon the main period of the seasonal testicular involution occurs during October, so that by the end of this month nearly all members of the population have finished their spermatogenetic activity and possess gonads of minimal size.

Although the above could be taken as the general broad outline of the breeding rhythm, it was found that individuals taken in any particular month in any one year could be appreciably more or less advanced in their spermatogenetic development compared with the equivalent samples of other years. Furthermore, the situation could be changed within a month. An early start to spermatogenesis did not necessarily mean an early finish, and day to day events had obviously an important influential role in the degree of activity reached.

Annual variations in the breeding rhythm

The yearly differences in the rate of spring recrudescence can be seen in fig. 1 and tables 2 and 3. The pattern of gonadal development from the winter's fully regressed condition to the fully developed breeding condition was not uniformly the same each year. Each annual cycle had its own characteristic features superimposed by the accelerating or retarding influence of changing proximate factors in the animal's environment. The variations from one year to the next are analysed on a monthly basis below.

January. In 1959 mean testis volume was appreciably greater than that of similar samples in the succeeding five years. As might be expected, histological examination confirmed that spermatogenesis was likewise more advanced, half the specimens having begun spermatogonial division. One individual had even started producing spermatids. Spermatogenesis had also begun in over half the birds examined in 1964 but none had reached stage iv and mean gonad volume was only 38 cu. mm. compared with 58 cu. mm. in 1959. In 1963 only one of the eight specimens collected in this month had begun spermatogenesis and mean testis volume was 24 cu. mm. Birds in the other years are considered equal in development, no spermatogonial division being observed in any of the specimens examined.

In the females there may have been some differences in the frequency distribution of follicle size between years, but mean follicle size did not

seem to vary significantly and all groups appeared to be in the same condition.

February. Following the early activity already initiated in January, spermatogenesis was noticeably advanced during this month in the 1959 birds. About a third of those examined in February had produced spermatids. Testis volume also increased noticeably during the January-February period of 1961; two specimens had testis tubules with spermatids and birds in this year appeared to rank second in their development to the 1959 group. In the other years birds had not yet advanced beyond spermatogonial division, except in 1962 when two out of the eleven examined had numerous primary and some secondary spermatocytes. The remaining years were considered equal in the stage of development reached by the birds during this month. The advanced condition in January 1964 was not maintained in February.

There were no significant differences in mean follicle size in the different years (table 3).

March. It was noticeable that during 1963 testis size increased markedly; most of the males examined microscopically during March had spermatids and some had bunches of spermatozoa. This rather spectacular burst of activity resulted in the birds of this year becoming more advanced than those at a similar stage in the other study years. Testis growth and spermatogenetic development during 1959 and 1961 suggest that these birds should rank as joint second in development, there being insufficient evidence to differentiate the samples. It is clear, however, that birds in 1962 and 1964 were more retarded than those in the other years and no specimens were found with spermatozoa in the seminiferous tubules. In all the other years some adults with testes in a full breeding condition were always collected during this month. On the basis of testis volume, 1960 (when a large sample of 32 was examined) and 1964 were years when gonad growth was similar, though the sectioned material suggested that spermatogenesis was much more advanced in 1960. It seems likely that there was a wider scatter of birds in different stages of spermatogenesis in the latter year and this may have depressed the mean testis volume compared with 1964.

The available ovarian data do not indicate any marked differences in oogenesis between females in different years. If March and April are considered together, however, there are grounds for considering 1959, 1961, 1963 and 1964 to be years with advanced follicle development compared with 1960 and 1962.

April. During this month adult specimens were collected only in 1962, 1963 and 1964. In 1963 all adult males were in full breeding condition, but in the preceding and succeeding years half the sample

had not yet reached the peak of spermatogenetic activity.

May. By this time nearly all the adult males in every year were producing spermatozoa and had virtually attained full breeding condition. Though the samples are small, oogenesis seems to have advanced more in 1963 and 1964 than in other years.

Influence of weather factors

The meteorological data for the period of the investigation are summarised in table 1.

Temperature. In each of the three years in which some spermatogenetic activity was noted in January (1959, 1963, 1964) the mean temperature for this month was lower than in the other years under review. During February 1959 it remained fairly cold, but, surprisingly, the testicular recrudescence was fairly advanced. The temperature rose markedly in February 1961 and apparently accelerated gonad enlargement during this year, so that spermatogenesis nearly reached a level of development seen only in 1959. However, spermatogenesis was also well established in the specimens killed in February 1962, in spite of its being a cold year. In the same month of 1964, on the other hand, a rise of 2.7°C in the mean temperature between January and February did not prevent a retardation of vernal recovery.

There appears to be little relationship between spermatogenesis and the environmental temperatures during January and February. This is not the case when one analyses the results for March. The spring continued to remain mild in 1961 and spermatogenesis continued to develop rapidly as it did in 1959. The reproductive cycle during 1963 was a particularly interesting one. In February spermatogenesis was relatively retarded, but by March there had been a marked outburst of cell division so that the birds collected at this time became among the most advanced specimens in comparison with March birds of other years. Though the mean March temperature remained fairly low that year, there had been a very big increase of 6.6°C since the February mean and it seems reasonable to associate this with the acceleration of spermatogenesis. In contrast, although some specimens were in stage III as early as February in 1962, very little advancement had been made by March when a single specimen was producing spermatids and the remainder still remained at stage III or below. The evolution of the breeding cycle had obviously been retarded and a drop of 1.6°C in the mean temperature seems likely to have been the inhibitory factor. However, the actual temperature was probably not the only factor involved and there were some inconsistencies. For example, the spring of 1960 was warm compared with 1963, but spermatogenesis was not so advanced in March 1960, even though there had been a

fairly marked temperature rise of 2.7°C since the February.

The reproductive cycle was exceptional in 1961 in that, although gametogenetic development was well advanced by March, this was not sustained during April. The April temperature of this year was the highest recorded, although actual sunshine was much less than in most other years. Conversely, there was a marked gametogenetic acceleration during April 1964, in spite of the temperature and sunshine being the lowest recorded. In this latter situation, however, the actual temperature rise from the previous month's mean was proportionately the greatest recorded. There seem to be grounds for suspecting that a sharp rise in temperature may have been more effective than temperature in itself.

There was no indication that female gametogenesis was correlated with temperature.

Sunshine. There was no obvious relationship between the amount of sunshine in January and February and spermatogenesis. While these months had been sunny in 1959 (when spermatogenesis was most advanced), the January of 1964 had been particularly dull (yet spermatogenesis was advanced). There was no marked acceleration of spermatogenesis in 1962, in spite of there being an exceptional amount of winter sunshine. The years when the collected specimens showed the most advanced spermatogenesis in March were also years with most sunshine (1959, 1961 and 1963), but in 1962 there was as much sunshine in March as in 1959, yet spermatogenesis was relatively retarded. However, although there was above the average amount of sunshine in March 1962, there was a drop in temperature. In March 1963, when gonads were most advanced but the mean temperature was low (there had been a big increase since the February), there had been a lot of sunshine (the second sunniest March of the six years studied). It is possible that temperature and sunshine might act synergistically to stimulate the neuroendocrine apparatus. Hence the retarding effect of a depression of the environmental temperature might partially be overcome during periods of prolonged sunshine and vice versa.

Frost. If extreme cold, manifest by the number of days with ground frost, had any inhibitory effect on the gonads, it is not apparent in the tables. Thus, in the January and February of 1963, which were the coldest months on record for many years, spermatogenetic development was average. In March 1962 exceptional frost was experienced and the gonads were retarded, but this may have been a temperature effect only. Thus, spermatogenesis accelerated between March and April 1964, even though there was an exceptional amount of frost in the April.

Rainfall. There is no indication that the amount of rain in itself was

correlated with gonad development in this species. In January advanced spermatogenesis was recorded in a wet year (1959) and in a dry one (1964). Similarly, in a wet March (1959 and 1963) spermatogenesis was as advanced as in a dry one (1961). Precipitation might conceivably influence clover growth and have an effect via the food supply (see below), but no years were experienced when drought prevented clover growth sufficiently to test this point. Similarly, rainfall might be associated with a lack of sunshine, but, again, overcast conditions without rain are such a feature of the English winter that the effect could not be isolated. Clearly, rainfall or associated factors did not have a profound effect on gonad recrudescence in this temperate zone species, although it has been shown to be highly influential in the xerophilous Red-billed Weaver *Quelea quelea* (Marshall and Disney 1957).

Influence of the food supply

In the area from which the specimens were collected, the normal diet of the Woodpigeon in January, February and early March comprises over 80% clover leaves (Murton, Westwood and Isaacson 1964a). Cereal seed is collected as soon as it becomes available on the spring sowings, usually from about mid-March, and food supplies are good from this time onwards. Population size is governed by the amount of clover in winter, quantitative data having been given in previous publications (Murton, Westwood and Isaacson 1964b, Murton 1965). Objective information on the amount of clover available in 1959 was not collected, but it was probably the best year studied, because an exceptionally high pigeon population was maintained throughout the winter. There were four years with a good February food supply (in decreasing order, 1959, 1960, 1961 and 1962) and they were also the ones, except for 1960, in which spermatogenesis was advanced. The food situation was worsening in February 1960, however, as evidenced by a low food index in March (a drop from 2013 in February to 1338 in March) and this was not the case in the other three years. Spermatogenetic development in February 1960 was also retarded in relation to the other three years, while in 1963 and 1964, the final two years studied, winter food stocks were poor and spermatogenesis in February was noticeably inhibited. Thus, the six years in decreasing order of food stocks in February could be ranked 1959, 1961, 1962, 1960, 1964 and 1963. Spermatogenetic development in February was most advanced in birds taken in 1959 and then followed 1961 and 1962, while 1960, 1963 and 1964 ranked the same with the birds least developed.

The surge of clover growth in March partly depends on temperature (as, of course, does all growth), but the absence of exact details for 1959, together with the fact that an apparent big increase in avail-

ability in 1962 was caused by the disappearance of snow, makes the remaining series of records insufficient to separate the effects of food from temperature in March. Thus, while the spring of 1961 had an apparently high rate of clover growth, the temperature then was also high. Similarly, the sudden increase in spermatogenesis between February and March 1963, which it was suggested could have been linked with a big rise in temperature, could also be linked with the appearance of a very good food supply. It seems that if the food supply had any direct effect on spermatogenesis this was only manifest in the early winter (January and February).

The influence of population density

The density of pigeons per 100 acres of the study area in different seasons has been presented in other publications (Murton, Westwood and Isaacson 1964b, Murton 1965). When these data were compared with the spermatogenetic condition of males, no relationships were apparent; the data showed that advanced spermatogenesis in January could equally be found at high (1959) and low (1964) population densities. For February there was some suggestion that high population densities were associated with advanced spermatogenesis, but this may have depended on the relationship already noted between gonad condition and food stocks, because population size in mid-winter is determined by the food supply (Murton 1965). Testis condition in March and April was not apparently associated with population size. Of 28 adult males examined in May, only one had not reached stage v (table 2), and from this time on all those examined were in full breeding condition (29 were examined in June and 43 in July). There have been considerable variations in the breeding population in different years, numbers varying between 41 and 74 birds per 100 acres (see Murton 1965 for summary). It must, therefore, be concluded that the variations in population density so far experienced have had no effect on the sperm-producing ability of adult males.

Females may possibly have been more advanced in May 1963 and May 1964 (table 3) which were months when the breeding population was exceptionally low. But this was not the case in May 1961, also a year of low density, and there were no differences between years in June or July that could be attributed to population density. The effect of population size on juvenile breeding is considered in the discussion below.

DISCUSSION

The results do not implicate any single proximate factor as being of over-riding importance in regulating gametogenesis throughout the whole of the winter and spring and this conclusion agrees with the

views advanced by Marshall (1951). There are grounds for suspecting that different proximate factors had differing degrees of significance depending on the time of year. For example, food stocks seemed to be the only important factor involved in February, whereas temperature or temperature changes were most important in March when food supplies were no longer limited. Thus the advanced condition of the birds in late winter and spring of 1959 seems attributable to a combination of favourable environmental stimuli. Food was particularly abundant early in the winter and there followed a warm, sunny spring. Though January and February had been relatively cold months, they were nevertheless very sunny. In contrast, 1960 was not marked by any noticeably favourable environmental factors and the birds were rather slow in their spermatogenetic development.

Analysis suggests that environmental stimuli were as favourable in 1961 as they had been in 1959, yet the birds finished up more retarded in their spermatogenesis. The food supply was only average at the beginning of the year, but thereafter it improved. The spring temperature was exceptionally high, though the amount of sunshine varied from good to bad in the four months to April. In brief, a reasonably rapid development of the reproductive apparatus might have been anticipated. Testis development was in fact advanced in March, but slowed down in April. As the temperature remained the highest recorded for this month over the six years, the only factor so far considered that could be incriminated is the amount of sunshine, which was low. If lack of sunshine was the inhibitor it becomes difficult to explain why gametogenesis advanced rapidly between March and April 1964 when it was both cold and exceptionally dull. It seems necessary to invoke some other factor to explain the result in this year. There is circumstantial evidence to suggest that retardation may have been due to the inhibitory action of various chlorinated-hydrocarbon insecticides that were used as cereal seed dressings against wheat bulb-fly. The use of these chemicals, which included dieldrin, gamma BHC and heptachlor, reached a peak in the spring sowing season of 1961 (March and April) and they resulted in considerable direct mortality among the local pigeons. The situation has been documented by Murton and Vizoso (1963) who showed that this poisoning caused about a 20% reduction in the population. De Witt (1955) has demonstrated the inhibitory effect of these chemicals on egg production in game-birds and it seems reasonable to suppose that they may have caused the changes observed in this case, but direct proof is lacking.

In 1962, apart from the sharp temperature rise in April, there was no significant elevation of possible stimulatory factors during the early development of the cycle and its evolution was relatively slow.

In both 1963 and 1964 there existed environmental conditions which might have been expected to inhibit gonad growth. In both winters the mean temperature was low, as also was the amount of sunshine in 1964. In spite of this, 1963 finished a particularly advanced year for spermatogenesis, and in 1964, too, the testes had developed more than the average by April. In both years the food supply was poor in February, particularly so in February 1963, but it then improved markedly in March, when the blanketing snow cover thawed. In both years population density was low and it was particularly low in 1964 when only about half the birds were adults. Population density was also low in the spring of 1961, but this season was unusual because of the wide use of toxic chemicals (mid-winter numbers were not particularly low). Numbers were low in 1960 and this did not seem to have facilitated exceptional gonad development, while, conversely, a very high population in 1959 appeared to have no inhibitory effects. It seems, therefore, that the abrupt and very large rise in temperature between February and March 1963 and the big rise between March and April of 1964 were the factors most likely involved. Similarly, there was a sharp rise in temperature from March to April 1962 and an associated acceleration of cell division, while the inhibitory effect of the temperature drop between February and March in the same year has been mentioned.

For males, then, it seems that poor food supplies may have had an inhibitory effect up until February, but that from March onwards temperature was having a more significant role. While generally high temperatures may have been favourable, sharp rises in temperature appear to have had a greater stimulatory effect and, conversely, drops in temperature an inhibitory effect.

Population density does not seem to have been an important factor in spermatogenesis. During the breeding season birds were collected at random from the population. The fact that no males were retarded argues that if there was any failure to breed at high population density it could not be attributed to physiological inability.

The situation regarding females is less clear. The impression gained is that there was no difference between the birds' condition in different years over the January to March period, suggesting that they have an autonomous cycle. In the Woodpigeon most adult males take up their territories in March while a few may do so in late February (Murton and Isaacson 1962). By March nearly a third of the adults have produced bunched spermatozoa. A rise in the number of birds holding territories in July is attributed to the establishment of juveniles in the breeding population and this would be in keeping with their later attainment of reproductive maturity. In pigeons, as in most birds, the male determines the start of the breeding season by his ability to

acquire a suitable territory. Females move into areas held by males, behave in a submissive manner (unlike intruding males) until accepted, when pairing occurs. The final reproductive development of the female is dependent on stimuli from the male and the final development of the gonads is both profound and rapid once pairing is achieved (Bartelmez 1912, Lehrman 1959).

From the foregoing it seems reasonable to postulate that females would not need to respond as directly as males, if at all, to environmental timing factors. A major factor regulating the onset of oogenesis could therefore be the females' ability to find, and become attached to, an unmated male in a territory. Once this has taken place, exposure to such stimuli as the presence of nesting material, caressing displays and courtship feeding will regulate the mechanisms leading to ovulation. Lehrman (1961) has demonstrated the marked effect that such factors can produce at this stage. These final regulators could in turn be influenced by the food supply in determining how long the pair could spend together in the territory (Murton and Isaacson 1962). If the final rapid growth of the follicle from around 5.5 mm. to 22 mm. in diameter depends on pairing and male stimulation, a sample of females collected in a year when it is easy to find territorial males relatively undisturbed by competitors should show a higher proportion of females in the final rapid stages of follicle growth. In 1963 and 1964 the breeding population was exceptionally low and table 3 shows that the frequency of birds with follicles over 5 mm. in diameter—suggesting they were paired—was much higher in these two years. These were not years with otherwise particularly favourable environmental conditions.

It might be expected that juvenile females would suffer less in competition with adult females than would juvenile males with adult males, because of the more active role played by the male. However, an autonomous retardation of maturation could prevent an undesirable, precocious development of the young. Based on follicle measurements, juvenile females seemed to be at no time more advanced in 1964, when population density was low, than in the other years (data not presented). In contrast, juvenile males were unusually advanced in the first part of 1964 compared with the other years for which information is available (table 2). The only striking feature of that year was the very low population density and the exceptionally high ratio of juveniles, because the population was recovering from the catastrophic reductions of the previous year when very few young survived to breed. It is feasible that the juveniles in 1964 suffered little competition from adult males.

The timing factors so far considered have been manifest during gametogenesis, but by July, when the breeding season really begins,

both sexes, adults and juveniles, are capable of breeding. Nonetheless, some individuals, usually adults, would have had better opportunities earlier to acquire suitable territories, and hence mates, and to what extent this would be valuable is not at present known. It follows that environmental factors influencing gametogenesis, or at least spermatogenesis, are of little consequence in the final timing of egg-laying. In fact, as a two-month period exists between maturation and egg-laying, there is ample time for late developing birds to catch up, though this would not of course be the case in a species where the achievement of gonad maturation and actual breeding was more coincidental. In fact, little relationship between actual egg-laying and earlier gametogenesis was found. The year 1963 was an early season, but the summer was quite fine, so that cereals ripened early, and this early development of the food supply was probably the important factor. Even so, judged by maximum occupied nest density, the three early years for spermatogenesis, 1959, 1963 and 1964, were ones when all the population reached breeding condition sooner than in the other years, though judged by the point when 75% of the population had occupied nests (i.e. were incubating eggs or brooding young) 1959 and 1964 were somewhat late. It seems likely that factors operating in the period May-July had a more profound timing effect, so far as egg-laying was concerned, than the condition reached by the males or females in April. The age structure of the population could effect the point of peak breeding, because juveniles are normally later in nesting, although no correlation was apparent between the juvenile ratio and date of breeding.

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SUMMARY

A microscopical examination was made of the gonads of Woodpigeons *Columba palumbus* collected throughout the spring months in the years 1959-64 from a study area centred on Carlton, Cambridgeshire, and annual variations in the rate of spermatogenetic recovery were assessed.

Woodpigeons, like almost all other birds, are seasonal breeders and after the breeding season the gonads regress to a minimum size. In the Woodpigeon this post-nuptial regression lasts from late September to early March. Appropriate daylengths will cause the testes of regressed Woodpigeons to develop from the small resting condition, when each tubule is surrounded by a single ring of inactive germ cells, the spermatogonia, to the full breeding condition. In this process the tubules expand, as does the whole organ, and the spermatogonia divide to produce various intermediate cell types culminating in mature spermatozoa. This process of sperma-

togenesis is conveniently described by categorising the histological stages according to the cell types (pages 263-264). The female ovarian follicles increase in diameter as development proceeds and for them direct measurement suffices as an indication of the rate of the process. The process of gametogenesis is, however, either 'accelerated' by other favourable environmental stimuli, such as increases in temperature, availability of food, territory and nest site, or 'inhibited' by unfavourable stimuli. In this paper an attempt is made to correlate annual variations in certain environmental stimuli (except of course light, which could modify gametogenesis) with annual differences in the rate of spring gonad development.

For males absolute temperature or changes in temperature were of little or no importance in January or February during the first stages of spermatogenetic recovery. But in March, when active cell division was in progress, temperature was influential. In particular, sharp increases in temperature accelerated, while marked decreases in temperature inhibited, germ cell division. It was not easy to isolate the effects of sunshine from those of temperature, high spring temperatures frequently being associated with much sunshine. The results obtained suggest that sunshine could act synergistically with temperature changes to stimulate the neuro-endocrine apparatus. As was the case with temperature changes, sunshine had no effect on the birds in January and February when the gonads were in a resting state or were only just beginning recrudescence.

Neither the amount of frost in winter nor the rainfall had in themselves significant modifying influences on gonad development. Most ground frost was recorded in January and February before spermatogenesis really began, while there was only one year (1962) when exceptional frost was recorded in March and the gonads were retarded, but it is more likely that this resulted from the inhibitory effects of a sharp drop in temperature.

In those years when the birds' clover food supply was good, males were more advanced in their spermatogenetic condition in the February, and the food supply may also have been influential in January. By March the food supply was always good and temperature effects masked any influences of food availability.

The results do not implicate any single factor as being of over-riding importance in regulating spermatogenesis throughout the whole of the winter and spring, but rather that different proximate factors had differing degrees of significance at different times, the final development of the gonad depending on the combined effect of all the stimuli. The rate of development achieved by the males in different years could be accounted for on this basis, 1959 being the year spermatogenesis was most rapid and nearly all environmental stimuli were favourable, in contrast to 1962 when development was slow and environmental stimuli were generally least favourable. An exception was noted in April 1961. In that year conditions had been good up to March and gonad development proceeded normally, but there was then a marked relaxation of development in April in the face of particularly favourable environmental conditions. The only factor which could be incriminated to explain this situation was the large scale use of certain toxic organo-chlorine insecticides which were known to have been extensively used in that year and which resulted in exceptional Woodpigeon mortality in the spring. It is also known that these chemicals can have adverse effects on reproduction, though the exact mechanism of this is at present unknown.

Unlike the males, the females were unaffected by variations in environmental stimuli and appeared to have an autonomous cycle until about April. This is attributed to the fact that, for appropriate seasonal breeding, males must find and establish territories as soon as possible, whereas females need only respond to male stimulation once territories are established. A higher percentage of adult females had large follicles (indicating that they were paired) in years when population density was low and it is suggested that this depended on the ease with which they could

find and become paired to territory owning males without being chivied by numerous competitors. The final burst of follicle growth depends on stimuli normally only experienced during actual courtship.

In 1964 juvenile males were unusually advanced in their spermatogenesis and this was a year of exceptionally low population density. It is suggested that in this season the juveniles found it easier to acquire a territory and that its possession facilitated rapid spermatogenesis. With this exception and the one mentioned above for females, population density appeared to have no effect on gametogenetic recovery. This was in spite of wide fluctuations in numbers being recorded in different years and so it seems unlikely that reproductive potential could be adjusted to population size at this stage of the cycle. No males were found which failed to achieve full spermatogenesis by the beginning of the breeding season and there was no histological evidence to suggest that non-breeding animals occurred in the population to lower its overall fecundity.

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Report on rare birds in Great Britain in 1965

(with 1958, 1959, 1961, 1962, 1963 and 1964 additions)

By D. D. Harber and the Rarities Committee

THIS, THE EIGHTH annual report of the Rarities Committee, has been compiled after the examination of over 300 records for 1965. This is a larger total than those for the two preceding years (leaving out of account the invasion of Cranes *Grus grus* in the autumn of 1963). The proportion of records rejected was about 27%. This compares with about 39% rejected in 1962, about 32% in 1963 and about 27% in 1964. (These figures take into account only the species now on our list and, once again, do not include the 1963 Cranes.) This pleasing decline in the percentage of records rejected is undoubtedly due to improved standards of observation and presentation. We hope that this trend will continue and would stress once again in this connection the value of the 'Unusual Record' form devised by D. G. Bell (*Brit.*

Birds, 58: 228-229). It can be obtained, free of charge, from the Hon. Secretary.

We have had before us an unusual number of records for past years; and one additional one for 1958, one for 1961, one for 1962, four for 1963 and ten for 1964 will be found at the end of this report. A few 1965 records remain outstanding, either because they were received late or because they present special difficulties. Once again our views have been requested and given on a number of Irish records. But, of course, Irish records are accepted or rejected by the *Irish Bird Report*, not by us, and the Irish records mentioned in the systematic list below are taken from there.

The composition of the Committee has now remained the same for three years with P. A. D. Hollom (Chairman), D. D. Harber (Hon. Secretary), D. G. Bell, A. R. M. Blake, Peter Davis, M. F. M. Meiklejohn, G. A. Pyman, F. R. Smith, R. Wagstaffe and D. I. M. Wallace. This stability of membership has undoubtedly facilitated the speed and efficiency of our work. We are also glad to report that the great majority of records now reach us reasonably quickly, though a few do still come in with what seems to be unnecessary slowness.

The principles and procedure we follow in considering records were explained at length in the 1958 report (*Brit. Birds*, 53: 155-156). At the very end of the present report is an up-to-date list of the species which are dealt with by us; reprints of this list are available and can be obtained from the Hon. Secretary. In this connection, unnecessary correspondence is caused every year by observers sending in records of species which are either not now on our lists or (quite often) have never been on it.

The systematic list of records is set out in the same way as its predecessors. The following points, some of which were outlined more fully in the 1958 report (*Brit. Birds*, 53: 156-158), should be borne in mind since they show the basis on which the information has been put together:

(i) The scientific nomenclature, which has hitherto followed the B.O.U. *Check-List of the Birds of Great Britain and Ireland* (1952) with the amendments subsequently proposed (*Ibis*, 98: 157-168) and those resulting from the decisions of the International Commission for Zoological Nomenclature (*Ibis*, 99: 369), is now based on the more up-to-date work of Charles Vaurie's *The Birds of the Palearctic Fauna* (1959-65). Any slight records of subspecies (including those of birds trapped and released) are normally referred to as 'showing the characters' of the race concerned.

(ii) No record which would constitute the first for Great Britain and Ireland is published by us, even if we consider it acceptable, until it has been passed by the Records Committee of the British Ornithologists' Union.

(iii) In general, the report is confined to records which are regarded as certain. Probables are never included and square brackets are used only to denote likely escapes or releases from captivity. In the case of the very similar Long-billed and Short-billed Dowitchers *Limnodromus scolopaceus* and *L. grisetus*, however, we are

continuing to publish indeterminate records and this will also apply to observations of such 'difficult' groups as frigate-birds *Fregata spp.* and albatrosses *Diomedea spp.* if and when they occur.

(iv) The basic details included for each record are (1) county; (2) locality; (3) number of birds if more than one, and age and sex if known (in the cases of spring and summer records, however, the age is given only where the bird concerned was not in adult summer plumage); (4) if trapped or found dead; (5) date or dates; and (6) observer or observers up to three in number, in alphabetical order. Other relevant information is sometimes added at the end of individual records and general comments may be given in a subsequent paragraph; although the report as a whole is confined to Great Britain, these general comments may also cover Ireland and other European countries.

We are making two minor changes in the present report. First, we are replacing the appendix of 'Observations in "Recent reports" not now accepted' by a complete list of the records rejected by us for the year. This will contain dates and localities, but not names of observers. It will, we hope, eliminate the possibility of future confusion as to whether any particular record has been considered by us or not. Secondly, we are introducing (when necessary) a list of corrections of minor errors (e.g. in the spelling of observers' names). More serious mistakes (e.g. in dates and localities) will continue to be corrected in the supplementary systematic lists. It would be of great help if observers, particularly those who are sending in records for the first time, would *print* their own and the other names concerned. As it is, the Hon. Secretary is sometimes faced with an unknown signature which can be read either in more than one way or not at all.

Once again we thank the many individual observers and local organisations whose co-operation has made the publication of this report possible. The help given by R. Wagstaffe and the Staff of the Liverpool Museums in scrutinising records and comparing descriptions with specimen skins has been invaluable. D. I. M. Wallace has kindly been responsible for a number of the species comments in the present report. All records should now be sent to F. R. Smith at Telford, Hill Barton Road, Exeter, Devon, until further notice.

Systematic list of 1965 records accepted

Pied-billed Grebe (*Podilymbus podiceps*)

Somerset: Chew Valley Lake, 17th August to 28th October (D. G. Bell, G. L. Boyle, G. Sweet *et al.*).

Yorkshire: Beaverdyke Reservoir, near Harrogate, 9th June to 24th November (J. R. Mather, R. C. Parkinson, C. Worrin *et al.*).

These are only the second and third British and European records of this North American species, the first having been recorded at Blagdon Lake, Somerset, on 22nd December 1963 (*Brit. Birds*, 58: 305-309). It

should be added that, also in the summer of 1965, another Pied-billed Grebe came aboard the Shell tanker *Ondina* when she was two to three days out of Venezuela and was thus transported to Liverpool. Still in first-winter plumage, it was seen alive by R. Wagstaffe, but it died on 14th July and the skin is now in the City of Liverpool Museums (per Dr. D. A. P. Cooke).

Black-browed Albatross (*Diomedea melanophrys*)

Devon: Morte Point, 25th April (M. E. Greenhalgh).

Yorkshire: Spurn, 4th to 7th November (J. Cudworth, J. Whitaker, C. Winn *et al.*).

These are only the third and fourth British records of this species which breeds in far-southern waters and very rarely visits the North Atlantic. It should be noted, however, that 1963 and 1964 provided three records of albatrosses in Irish waters, one in each year being identified as Black-browed.

Cory's Shearwater (*Procellaria diomedea*)

Dorset: Portland Bill, 19th April (K. L. Fox); two, also 19th April (J. P. Eaton, B. King).

Isles of Scilly: between Scilly and the mainland, four, 21st August; four 4th September (S. C. Joyner, P. F. Twist, N. S. Twist); twelve, 18th September (E. Griffiths, P. Harrison, S. C. Madge). St. Agnes, seven, 22nd August; one, 24th August; ten, 28th August, twelve, 29th August (S. C. Joyner, P. F. Twist, N. S. Twist).

Shetland: Fair Isle, about 62, 18th September; about six, 19th September; 13, 20th September; two, 23rd September (R. H. Dennis *et al.*).

Yorkshire: Spurn, three, 19th September (J. R. Collman, G. R. Edwards, D. J. Standing *et al.*).

Judged by previous records from British waters, the above total of 14 records featuring about 130 birds is unprecedented, though larger numbers were recorded off south-west Ireland in August 1962 and July 1963 (*Brit. Birds*, 56: 189-190; 57: 200-202). The 1965 autumn occurrences were clearly associated with unusually large movements of Great Shearwaters *Puffinus gravis* and Sooty Shearwaters *P. griseus* in British and, more particularly, Irish waters (*Brit. Birds*, 59: 88, 253-254). The April records off the Dorset coast were quite exceptional, but, like the autumn observations, were paralleled by Irish ones. The species breeds as close to Britain as Portugal.

Purple Heron (*Ardea purpurea*)

Devon: Puslinch Bridge, near Newton Ferrers, 25th April to 10th May (L. I. Hamilton, R. F. Moore, R. M. Moore).

Glamorgan: Eglwys Nynnid Reservoir, 6th June (D. F. A. Kiddle, N. H. Pratt); juvenile, 16th to 18th October (N. Douglas-Jones, D. Griffin, A. J. Hambury *et al.*).

Norfolk: Cley, first-summer, 10th May (R. A. Richardson).

Shetland: Fair Isle, sub-adult, 17th to 22nd June (R. H. Dennis, J. Wilson, E. J. Wiseman *et al.*).

The eight years 1958-65 produced 35 British records of this summer visitor to the Netherlands and southern Europe. Annual totals have varied from one in 1962 to eight in 1963 and so the five above may be regarded as about average. With the exception of one in February and one in November, all the records have been during April-October with just over half (18 out of the 35) in April-May (see also under Little Egret below). In addition to the above, one was seen on Cape Clear Island, Co. Cork, on 2nd May 1965—only the second Irish record.

Little Egret (*Egretta garzetta*)

Anglesey: Afon Alaw estuary, 25th July to 7th August (D. C. Ager, P. Hope Jones, C. Tottey *et al.*).

Bedfordshire: near Heath and Reach, 5th June (H. Mayer-Gross, R. Pennell).

Devon: River Erme, 3rd to 20th April (R. BurrIDGE, P. Harrison, H. G. Hurrell *et al.*).

Kent: Stodmarsh, 12th June (A. S. Cheke, M. Davenport, A. W. Sudbury *et al.*).

Somerset: Axe estuary, 22nd May (T. R. J. Williams).

Sussex: Cuckmere Haven, 30th May (C. Bone, R. H. D. Young).

As has been pointed out on previous occasions, most sight records of this south European species do not exclude the Snowy Egret *E. thula* of North America, though the latter has never been recorded in this country. The eight years 1958-65 produced a total of 34 British records of the Little Egret. Annual totals have varied from one in 1964 to seven in 1961 and so the total of six above is on the high side. If we ignore a few individuals which have stayed into the winter months, all these 34 have been during March-November with March, May and June (seven each) as the most frequent months. The total of 34 is very similar to that for the Purple Heron above, but the records of Little Egrets have mostly been in southern counties whereas those of Purple Herons have been more widely scattered, particularly in eastern districts. This suggests that many of the Purple Herons may be of Dutch origin, rather than from southern Europe like the Little Egrets, a conclusion which is supported by the fact that the same period produced about eight records of Little Egrets, but only one of a Purple Heron, as far west as Ireland. There was one Little Egret in Ireland in 1965, on the North Bull, Co. Dublin, on 15th May.

Night Heron (*Nycticorax nycticorax*)

Devon: near Newton Ferrers, 4th April (R. BurrIDGE) and 29th April (P. Harrison).

Isles of Scilly: Treco, 26th March to 1st April (R. M. Curber, K. Hawkins, B. King *et al.*).

These are the first records for south-west England since 1961 and seem likely to have been of genuine vagrants from southern Europe rather than escapes.

Little Bittern (*Ixobrychus minutus*)

Ayrshire: Craigie Park, Ayr, ♂, 18th to 19th May (A. B. and D. Johnston, G. A. Richards).

Hertfordshire: Stevenage, ♂, 10th June (P. Walton).

Shetland: Scatness, ♀, 2nd to 10th June (D. Coutts, G. D. Joy, R. H. Dennis *et al.*).

The Ayrshire record was paralleled by an Irish one near Crumlin, Co. Antrim, on 13th May 1965.

White Stork (*Ciconia ciconia*)

East Lothian: near Innerwick, 16th to 17th March (M. J. Everett, A. Macdonald, A. T. Macmillan *et al.*).

Sussex: Bodiam, 19th September (Mrs. M. A. Stead, P. J. Stead).

The possibility that both these birds had escaped from captivity cannot be ruled out.

Glossy Ibis (*Plegadis falcinellus*)

Cornwall: near Wadebridge, the one first seen in December 1964 (see page 300) remained until 28th March (Rev. J. E. Beckerlegge, Dr H. V. Brown, G. McD. Warner *et al.*).

Sussex: Pagham Harbour, 22nd to 23rd April (A. Allen).

It is reasonable to suppose that both these records, and the one in Devon in November and December 1964 (*Brit. Birds*, 58: 357), relate to the same individual. The possibility that the bird(s) concerned had escaped from captivity cannot be ruled out. It should be added that a Glossy Ibis was shot in Co. Galway on 5th December 1965.

Green-winged Teal (*Anas crecca carolinensis*)

Drakes showing the characters of this American race were recorded as follows:

Norfolk: Cley, 10th May (R. A. Richardson).

Renfrewshire: Barr Loch, 10th to 19th April (J. M. S. Arnott, R. G. Caldow, L. A. Urquhart *et al.*).

Somerset: Stert Point, 13th to 21st March (R. A. Evans, R. D. Cades, C. E. Ridsdale *et al.*).

There have now been 16 records of drakes in Great Britain since 1960. Of these, ten have occurred between mid-March and mid-May. The same six-year period has seen four records in Ireland, including one near Blennerville and one at Akeagh Lough, both Co. Kerry, on 21st March and 17th October 1965 respectively.

American Wigeon (*Anas americana*)

Inverness-shire: Moray Firth, ♂, 17th January to 28th February (R. Clark, R. H. Dennis, Wing-Commander R. J. Fursman *et al.*).

This is only the fifth British record of a supposedly wild bird since 1958.

Ferruginous Duck (*Aythya nyroca*)

Essex: Abberton Reservoir, ♂, 29th October to 1st November (R. V. A. Marshall, W. E. Oddie, M. S. J. Snoxell); immature, 18th November to 8th December (F. K. Cobb, G. J. Jobson, R. V. A. Marshall *et al.*); another immature, 4th to 5th December (F. K. Cobb, G. J. Jobson, R. V. A. Marshall *et al.*).

Glamorgan: Eglwys Nynnid Reservoir, ♂, 2nd to 7th April (R. A. Cadman, Mrs. A. Heathcote, W. E. Jones *et al.*). Hensol Lake, ♂, 3rd to 4th November (Mrs. K. I. Collings, Mrs. A. Heathcote, Col. H. Morrey Salmon).

Hertfordshire: Tring Reservoirs, ♂, 3rd to 4th January (A. J. Livett, P. J. Mountford, R. V. A. Wagstaff).

Middlesex: Brent Reservoir, ♂, 5th November (L. A. Batten).

This south and east European and south Asiatic species is so commonly kept in captivity that it may be assumed that at least some of the above records relate to escapes.

Surf Scoter (*Melanitta perspicillata*)

Kirkcudbrightshire: Southerness Point, ♂, 13th February to 14th March (E. L. Roberts, J. H. Swan *et al.*). Portowarren, two adult and one immature ♂♂ and one ♀, 28th February to 4th April (J. A. Bailey, E. L. Roberts, A. J. Smith *et al.*); ♂, 27th December, staying on into 1966 (Miss P. G. Baxter, A. Paterson *et al.*).

Ross and Cromarty: Lewis, Broad Bay, near Stornoway, ♂, 4th to 9th February and 4th March (N. Elkins).

Wigtownshire: Luce Bay, ♂, 23rd February (E. S. Clare, M. J. Warren).

The above total of five records of this North American sea-duck (involving at least six individuals) is unprecedented in recent years. It seems that a small number has taken to wintering in the Solway area.

Harlequin (*Histrionicus histrionicus*)

Caithness: near Wick, ♂ and ♀, 18th April to 1st May (G. Gunn, Dr. I. D. Pennie, R. S. Shand *et al.*).

Shetland: Fair Isle, ♂ and ♀, 11th January to 2nd February (G. Barnes, J. A. Stout, J. Wilson).

It seems likely that the same birds were concerned in both the above records. There are seven previous British records for this north Holarctic species, the last being in 1954.

Ruddy Shelduck (*Tadorna ferruginea*)

[**Yorkshire:** Spurn, 14th November (A. Archer, B. R. Spence, D. J. Standing *et al.*).]

As we have stated previously, this species is commonly kept in

captivity, while the European breeding population is much smaller than was formerly the case.

Gyr Falcon (*Falco rusticolus*)

Cornwall: St. Michael's Mount—Marazion Marsh, 15th January to 9th February (Rev. J. E. Beckerlegge, R. G. Hadden, B. Pattenden).

Inverness-shire: near Kingussie, 24th March (C. C. I. Murdoch).

Isles of Scilly: Tresco, the one first recorded on 6th November 1964 (see page 301) was last seen on 5th January (D. R. Hunt).

Shetland: Fair Isle, 9th September (W. G. Porteous).

It seems likely that the one in Cornwall was the same individual as that last seen in Scilly a few days earlier. These records (and the supplementary ones from 1958, 1963 and 1964 on pages 299-301) bring the total number of British records of this circumpolar arctic species since 1958 to 15. This total includes five or six cases of extended stays suggesting wintering.

Red-footed Falcon (*Falco vespertinus*)

Hampshire: Rhine Field Walk, New Forest, first-summer ♂, 7th June (M. T. Barnes, C. A. E. Kirtland, O. R. Marks).

Norfolk: Mundesley, ♀, 26th May (A. J. Harris).

Crane (*Grus grus*)

Essex: North Fambridge, 14th October (G. D. S. Hooper, D. Stone). Goldhanger, 14th November (R. Bartlett, G. K. Martin, R. J. Thatcher *et al.*).

Suffolk: Flatford Mill, 19th September (R. M. Fry); Hinton, juvenile, 1st October (P. Muttitt).

Baillon's Crake (*Porzana pusilla*)

Yorkshire: near Guisborough, 10th to 12th May (A. Barnard, D. G. Bell, P. J. Stead *et al.*).

It may be that observations of this and the next species are mainly controlled by the minimal chance of their discovery. Nevertheless this is only the second record of this widespread Old World crake in Britain in the last twenty years, the other having been in Essex in June 1953.

Little Crake (*Porzana parva*)

Essex: River Crouch marshes, ♀, caught, 3rd April (D. and R. B. Warren).

There have been only six British and one Irish records of this species since 1958.

Short-billed Dowitcher (*Limnodromus grisens*)

Sussex: Sidlesham Ferry, 14th February to 15th March (D. D. Harber, L. G. Holloway, M. Shrubbs *et al.*).

This is only the sixth British record of this North American species, but individual dowitchers cannot always be specifically identified (see below).

Long-billed or Short-billed Dowitcher (*Limnodromus scolopaceus*
or *griseus*)

Shetland: Symbister, Whalsay, 20th October and 7th November (J. H. Simpson).

Somerset: Stert Point, 24th October (B. E. Slade).

Sussex: Pagham Harbour, 4th April (T. Banks, M. Harrison, D. Ware *et al.*). Chidham, 4th April (R. F. Porter). It seems likely that these two records relate to the Short-billed Dowitcher recorded earlier at Sidlesham Ferry (see above).

The winter and spring dates of the Sussex bird(s) are without precedent in Great Britain for either species of dowitcher. A Long-billed Dowitcher was identified at Akeagh Lough, Co. Kerry, on 26th and 27th September 1965.

Great Snipe (*Gallinago media*)

Shetland: Fair Isle, 1st May (R. H. Dennis, E. J. Wiseman); 27th September (E. J. Wiseman).

Lesser Yellowlegs (*Tringa flavipes*)

Lancashire: Inner Ribble Marshes, 11th to 12th August (M. E. Greenhalgh).

This North American species has been recorded annually in Great Britain since 1958, except for 1960. There have also been five records in Ireland in that time, including one at Tacumshin Lake, Co. Wexford, on 8th May 1965.

Spotted Sandpiper (*Tringa macularia*)

Isles of Scilly: St. Agnes, trapped, 23rd September to 28th October (B. Marshall, J. R. Mullins, C. S. Waller *et al.*).

This is only the second record of this North American bird (now once again regarded as a full species) since 1958. A note discussing its separation from the Common Sandpiper *T. hypoleucos* in the field when not in summer plumage is to be published later in this journal.

Baird's Sandpiper (*Calidris bairdii*)

Isles of Scilly: St Agnes, 25th September (E. Griffiths, A. Quinn, C. S. Waller *et al.*).

Suffolk: Havergate, 4th to 18th September (G. J. Jobson, R. J. Partridge, D. J. Pearson *et al.*).

With the above there are now ten British records of this North American wader, eight of them since 1950. There is also one Irish record, in 1962.



PLATE 39. 8th Congress, Oxford 1934. Excursion to Skokholm, Pembroke-
 hire, with H.M.S. *Windsor* and H.M.S. *Wolfhound* in the background (pages 257-261).
 Below, the President, Prof. Dr. E. Stresemann (back to camera) addressing members;
 arrows indicate H. F. Witherby and Rev. F. C. R. Jourdain (photos: H. Morrey Salmon)





PLATES 40A and B. 8th Congress, Oxford 1934. Left, Ferdinand of Bulgaria on H.M.S. *Windsor*. Above, G. M. Mathews (centre) and Prof. E. Lönnberg, the President of the Amsterdam Congress in 1930 (right) (photos: H. Morrey Salmon and Phyllis Barclay-Smith)

PLATES 40C, D and E. 9th Congress, Rouen 1938. Excursion to Camargue. Right, A. Holte Macpherson, W. E. Glegg and Dr. G. Carmichael Low. Below, H. A. Gilbert, G. M. Sutton, Mrs. E. Stresemann, Miss P. Barclay-Smith, Jean Delacour (General Secretary) and J. Urbain. Bottom right, Rev. F. C. R. Jourdain (looking down at camera) (photos: Harriet I. Jorgensen and W. Meise)



RE 41. 10th Congress,
ala 1950. Right, group
ling J. Lepiksaar and
nd Mrs. David Lack.
v left, Jean Delacour
Dr. R. C. Murphy at the
tion of photographs



ght, group including
ng Olsson, Dr. O.
r. E. Schüz and Dr.
Right, James Fisher
ith Dr. Kai Curry-
photos: Per Olof Swan-
ther Congress members)





PLATE 42. 11th Congress, Basle 1954. Above, E. M. Nicholson, H. Frith and Jean Delacour at Pontresina. Below, Miss P. Barclay-Smith and Miss G. M. Rhodes near Scans. Both these localities are in the Upper Engadine of south-east Switzerland and show something of this country's matchless scenery (*photos: Charles G. Sibley*)





PLATE 43. 11th Congress, Basle 1954. Above, Prof. Dr. E. Stresemann and Col. R. Meinertzhagen at Lake Lucerne (*photo: Charles G. Sibley*). Below, Prof. Sven Hörstadius, the General Secretary of the 10th Congress, standing at Berne with Sir A. Landsborough Thomson, the President of the 11th Congress (*photo: A. Wetmore*)



PLATE 44

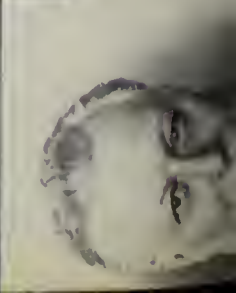
PRESIDENTS OF THE
INTERNATIONAL
ORNITHOLOGICAL CONGRESSES
from 1934 to 1966

Prof. Dr. E. Stresemann
OXFORD 1934

Sir A. Landsborough Thomson
BASLE 1954



Prof. A. Ghigi
ROUEN 1938



Prof. J. Berlioz
HELSINKI 1958





Dr. David Lack
OXFORD 1966



Dr. Ernst Mayr
ITHACA 1962



Dr. A. Wetmore
UPPSALA 1950





PLATE 45. 12th Congress, Helsinki 1958. Above, on an island in the Helsinki archipelago where there was a colony of Caspian Terns; near the camera are R.-D. Etchécopar (centre, back view) and Dr. J. Dorst (profile). Below, group near an Osprey's nest, including Dr. G. Zink and Dr. E. Moltoni (*photos: Paul Gérondet*)





PLATE 46. 12th Congress, Helsinki 1958. Group at nest of Red-necked Phalarope on Limenka marshes, including Dr. Robert W. Storer (back view) and Dr. A. Wetmore (right). Below, Dr. Lars von Haartman, the General Secretary (left), and Prof. Einari Merikallio, author of *Finnish Birds* (photos: Eric Hosking and Paul Gérondet)







PLATE 48. 13th Congress, Ithaca 1962. Upper, E. R. Parrinder, Dr. Roger Tory Peterson and Guy Mountfort. Lower, Dr. Donald S. Farnier and Dr. Kai Curry-Lindahl among others, with photographic exhibit behind (*photos: 13th Congress*)

47 (*opposite*). 13th Congress, Ithaca 1962. Top, group including Dr. [unclear] (left) and Dr. Charles Vaurie (facing). Centre, R. E. Moreau with H. Thorpe and Dr. James Monk. Bottom, Dr. J. A. Valverde talking to [unclear] Goethe in centre, with Dr. G. Zink on right (*photos: 13th Congress*)



PLATE 49. Above, 12th Congress, Helsinki 1958. Prof. V. C. Wynne-Edwards talking to Prof. Charles G. Sibley, the Secretary-General of the 1962 Congress. Below, 13th Congress, Ithaca 1962. Two distinguished ornithologists from south-east Asia, Loke Wan Tho of Malaya and Dr. Salim Ali of India (*photos: Eric Hosking*)



White-rumped Sandpiper (*Calidris fuscicollis*)

Cornwall: Marazion Marsh, 5th November (Rev. J. E. Beckerlegge, R. G. Hadden).
Isles of Scilly: Tresco, trapped, 6th to 28th September (D. Hunt, P. Z. Mackenzie, J. C. Rolls *et al.*).

There was also one at Akcagh Lough, Co. Kerry, from 28th February to 14th March.

Semi-palmated Sandpiper (*Calidris pusilla*)

Kent: Dungeness, 6th to 9th September (A. J. Greenlands, J. G. Harrison, R. E. Scott *et al.*).

This is the fourth British record of this North American species.

Buff-breasted Sandpiper (*Tryngites subruficollis*)

Devon: Lundy, two, 27th to 28th September (A. J. Vickery).

Dorset: West Fleet, Weymouth, 16th August (B. and P. Roscoe).

Norfolk: Thornham—Holme, 26th September to 3rd October (E. J. Cottier, J. A. W. Moyes, M. Webber *et al.*).

Black-winged Stilt (*Himantopus himantopus*)

Anglesey: Newborough Warren, 23rd August (K. A. Roberts).

Hampshire: Dibden Bay, Southampton Water, three, 10th April (E. M. Miller).

Huntingdonshire: Diddington Reservoir, 17th to 24th August (Mrs Lovell, J. T. R. Sharrock *et al.*).

Kent: Hythe, Palmarsh, 23rd May (C. H. Dean).

Lincolnshire: Gibraltar Point, two, 26th April (J. A. Ewan, J. C. Sillitoe).

Norfolk: Holme, 3rd May (P. R. Clarke). Near Reedham, two, 25th May (D. A. Dorling, M. J. Seago).

Shropshire: Venus Pool, Shrewsbury, two, 20th May (Mr. and Mrs. J. Durtnall, P. Hope).

Somerset: Chew Valley Reservoir, two, 22nd to 25th May (L. Brock, R. J. Prytherch, R. F. Thearle, *et al.*).

Suffolk: Felixstowe Golf Course, two, 20th to 28th April; one, 29th April (H. E. Axell, F. L. French, G. J. Jobson). Minsmere, two, 10th May; one, 11th May (H. E. Axell, Mrs. K. E. I. Barham, P. J. Makepeace *et al.*).

While the possibility of some of the spring records referring to the same individual(s) is fairly high, it is clear that there was an unprecedented and widespread influx in April and May. This immigration was presumably an example of the 'overshooting' phenomenon that characterises the spring occurrences here of several species which are summer visitors to southern Europe. We understand that a number of pairs of Black-winged Stilts nested in the Netherlands in 1965.

Stilt Sandpiper (*Micropalama himantopus*)

Lincolnshire/Norfolk: Wisbech sewage farm, 12th to 26th August (D. G. Bell, G. M. S. Easy, J. A. W. Moyes *et al.*).

This is the fifth British record, and the third in August, of this North American wader.

Wilson's Phalarope (*Phalaropus tricolor*)

Derbyshire: Ogston Reservoir, 23rd to 24th June (R. H. Appleby, R. A. Frost *et al.*).

Yorkshire: Scaling Dam Reservoir, 20th to 21st June (W. Norman, S. Norman, P. J. Stead *et al.*).

These are the 17th and 18th British records of this North American species, though it seems reasonable to suppose that the same individual was involved in both cases. The only Irish record was in 1961.

Cream-coloured Courser (*Cursorius cursor*)

East Lothian: Aberlady Bay, 9th to 21st October (D. Baty, I. Robertson, G. Waterston *et al.*).

Although *The Handbook* listed (up to 1939) about 27 records of this desert and steppe wader from Africa and southern Asia, it has in recent decades become extremely rare here. There has been only one other British record since 1958: in Devon in October 1959.

White-winged Black Tern (*Chlidonias leucopterus*)

Cornwall: Hayle Estuary, Drift Reservoir and Marazion Marsh, adult, 3rd to 6th August (Rev. J. E. Beckerlegge, N. R. Phillips, G. Raper).

Kent: Leybourne gravel pits, juvenile, 29th September (J. J. M. Flegg).

Northamptonshire: Hollowell Reservoir, two, 14th May (B. Cave, G. E. Dunmore, L. S. Taylor *et al.*).

The above three records constitute the lowest total of any of the last eight years, showing an extraordinary collapse from the record 18 or 19 observations in 1964.

Whiskered Tern (*Chlidonias hybrida*)

Cardiganshire: Glandyfri, adult, 11th July (B. E. Cooper, P. Clement, A. Quinn).

Cornwall: Marazion Marsh, 19th to 20th June (R. G. Hadden, R. D. Penhallurick).

This species, which breeds as near as south-central France, has been absent from our report only once in the last eight years.

Gull-billed Tern (*Gelochelidon nilotica*)

Kent: Sandwich Bay, 1st May (D. M. Batchelor).

Sussex: Selsey Bill, 29th May (B. King, J. C. Rolls); two 12th June (R. J. Johns); one, 13th June (H. P. Kay Robinson). Langney Point, 1st July (D. D. Harber); 5th July (R. H. Charlwood); two, 13th July (D. D. Harber). Holywell, Eastbourne, 20th August (D. D. Harber). It seems likely that some of these Sussex records relate to the same individual(s).

Caspian Tern (*Hydroprogne tschegrava*)

Yorkshire: South Gare, near Redcar, 26th September (T. Bradbury, L. Norman, S. C. Norman *et al.*).

Yellow-billed Cuckoo (*Coccyzus americanus*)

Isles of Scilly: St. Agnes, 28th October (D. Hunt, B. S. Milne, A. W. Sudbury).

There has only been one other British record of this American cuckoo since 1958 and that was in Sussex in December 1960.

Scops Owl (*Otus scops*)

Orkney: Kirkwall, 11th June (E. Balfour, D. Glue, Mrs. M. Traill-Clouston *et al.*).

This is the only British record since 1958, though the species migrates to breeding localities within 250 miles of southern England.

Snowy Owl (*Nyctea scandiaca*)

Aberdeenshire: Cabrach, 11th to 25th February (S. Roberts).

Aberdeenshire/Banffshire/Inverness-shire: ♂, 3rd June to 19th August; a different individual, 8th August; one to 17th October (A. D. Brewer, C. C. I. Murdoch, S. Roberts *et al.*).

Angus: near Kirriemuir, 22nd January (Miss I. F. Lindsay).

Hampshire: Pennington Marshes, 14th March (A. D. and J. M. Crocker). Brading Marsh, Isle of Wight, 28th March (Mrs. E. M. Henry, Mr. Sheppard, J. Stafford). These two records presumably relate to the same individual.

Kent: near Lydd, 23rd to 31st January (W. S. Nevin, C. Pain, Miss H. M. Rowland *et al.*).

Moray Basin: ♂ and ♀ from November 1964 (see page 301), ♂ last seen 7th February; ♀, 15th March; one 17th March; ♂ again present 29th August to at least 30th October (S. Roberts).

Northumberland: Low Hauxley, 28th November (E. Robson, P. Yeoman).

Orkney: North Ronaldsay, 11th to 17th April (K. G. Walker); 5th to 7th May (K. G. Walker). The latter was thought by the observer to be a different individual.

Isles of Scilly: the bird previously reported as having been present on various islands from 10th October 1964 was still about in early March (see also *Brit. Birds*, 59: plate 17).

Shetland: Fetlar, ♂, more or less continuously from 24th January to mid-December; ♀, 25th to 26th February; what was probably the above ♂ was also recorded on Mainland, Unst and Yell on various occasions. Whalsay, ♂, from 18th April; ♀, 18th to 29th June; then, a day or two later, two ♂♂, one of which was last seen 17th October and the other 11th November (W. Ogilvy, J. H. Simpson, R. J. Tulloch *et al.*). Fair Isle, ♂, 17th May (R. H. Dennis, Dr. M. Rusk, E. J. Wiseman *et al.*).

Only four of these circumpolar arctic owls were recorded in Britain in the five years 1958-62, three in Scotland and one in Wales. In 1963 two to four were recorded in Scotland and one in Essex, and then in 1964 Scottish records related to about seven birds while one was recorded from Suffolk and one from the Scillies. The 1965 records

show a further striking increase, including several from southern England. This sudden change in the apparent status of this species in Britain has taken place during a period in which, we are informed, 'surprisingly large' numbers have been imported for sale here. The records from southern England are, of course, particularly suspect, but at least some of those from more northerly localities may well also relate to escapes from captivity, particularly where summering birds are involved. It is perhaps of interest to add that there has been no record in Ireland since 1958.

Alpine Swift (*Apus melba*)

Devon: Lundy, 28th September (A. J. Vickery).

Hampshire: Gilkicker Point, 4th October (B. S. Duffin).

Hertfordshire/Middlesex: Troy Mill gravel pit, 26th September (Miss E. R. Gooding, J. D. Magee).

Norfolk: Cley, 3rd October (R. A. Richardson).

Orkney: North Ronaldsay, trapped, 8th June (K. G. Walker).

Sussex: Beachy Head, 7th August (R. F. Porter, I. R. Willis).

The last eight years have provided no less than 33 British records of this species which is found in southern Europe, southern Asia and Africa. In the same period there have been only two records in Ireland, including one at Ballycotton, Co. Cork, on 6th and 7th August 1965 (*cf.* the Sussex date above).

Bee-eater (*Merops apiaster*)

Glamorgan: Northgate, 6th July (P. J. Taylor, P. J. M. Thomas).

Roller (*Coracias garrulus*)

Carmarthenshire: Pentre-bach, near Halfway, 4th July (P. J. Chadwick, M. A. Wright) and 6th July (W. B. Yapp).

There have now been about 14 British (and one Irish) records of this south and east European, south-west Asian and north African species since 1958.

Short-toed Lark (*Calandrella cinerea*)

Essex: Hanningfield Reservoir, 20th May (S. Hudgell, R. P. Hull).

Shetland: Fair Isle, showing the characters of the rufous western races, 27th to 29th May (G. J. Barnes, R. H. Dennis, E. J. Wiseman).

In addition, one was identified on Inishtrahull, Co. Donegal, from 17th to 21st October 1965.

Crested Lark (*Galerida cristata*)

Cornwall: Marazion, 4th April (R. G. Hadden, N. R. Phillips *et al.*).

Though this species breeds north to the Channel coast of France and

the Low Countries, it remains a very rare vagrant to Britain. The above is only our third record since 1958.

Red-rumped Swallow (*Hirundo daurica*)

Yorkshire: Spurn, 13th May (G. R. Edwards, B. R. Spence, S. J. Weston *et al.*).

There have been six British records of this species since 1958. It is extending its breeding range northwards in Iberia and the Balkans.

Grey-checked Thrush (*Catharus minimus*)

Morayshire: Lossiemouth, found dying, 26th November (D. Careless, Capt. J. N. Humphreys R.N., Dr. J. G. Harrison).

Outer Hebrides: St. Kilda, 29th October, died during night (P. Grubb).

There are only three previous British records of this North American thrush, all in October.

Black-eared Wheatear (*Oenanthe hispanica*)

Norfolk: Salthouse, 30th August to 14th September (J. Crudass, P. Thomson, R. A. Richardson *et al.*).

This is the 19th British record of this common Mediterranean and Near East breeding species and only the third since 1956.

Thrush Nightingale (*Luscinia luscinia*)

Northumberland: Low Hauxley, first-winter, trapped, 26th September (G. Bruce, B. Galloway, E. Robson *et al.*); another first-winter, trapped, 2nd October (B. Galloway, B. Little, E. Robson *et al.*).

Shetland: Fair Isle, trapped, 24th to 26th May (G. J. Barnes, R. H. Dennis, E. J. Wiseman, *et al.*); another, trapped, 26th to 29th May (G. J. Barnes, R. H. Dennis, E. J. Wiseman *et al.*).

There are only three previous British records of this Scandinavian, east European and Asiatic species, all for Fair Isle and all in May. The above occurrences in Northumberland are therefore particularly interesting.

Savi's Warbler (*Locustella luscinioides*)

Kent: (locality suppressed), twelve ♂♂ were holding territory between 15th April and 12th July (R. G. Pitt *et al.*); one trapped in same area, 16th May (D. Batchelor, M. Davenport, J. Websper *et al.*).

Wiltshire: (locality suppressed), trapped, 6th to 15th May (D. Brotheridge, J. Squire, G. L. Webber *et al.*).

An account of the colonisation of Kent in recent years by this Continental European, west Asian and north African species, which used to breed in the fens of East Anglia until the middle of the 19th century, will appear in a future issue of *British Birds*.

Moustached Warbler (*Luscinola melanopogon*)

Buckinghamshire: Wendover, trapped, 31st July (D. N. Makepeace, D. R. Rose, K. Williamson *et al.*).

There are only four previous British records of this Mediterranean, east European and south-west Asian species, and this is the first to be examined in the hand here.

Great Reed Warbler (*Acrocephalus arundinaceus*)

Essex: Hanningfield Reservoir, 6th June (M. S. Freeman, S. Hudgell, A. P. Simcs *et al.*).

Kent: Stodmarsh, 13th June (J. Cranfield, R. Easts, M. Hollingsworth).

Suffolk: Walberswick, 5th September (D. J. Pearson).

Surrey: Frensham Great Pond, trapped, 7th to 19th June (P. G. Davis, V. R. Herbert *et al.*).

Sussex: Selsey Bill, 6th June (H. P. Kay Robinson).

Field observations do not normally exclude the Clamorous Reed Warbler *A. stentoreus* of southern Asia and Egypt, but this species is practically unknown in Europe.

Aquatic Warbler (*Acrocephalus paludicola*)

Cornwall: Marazion Marsh, trapped, 30th August (E. Griffiths, N. R. Phillips); River Camel, 23rd September (R. J. Salmon).

Hampshire: Stanpit Marsh, trapped, 14th August (D. F. Elliott, K. T. Standring, A. J. Wise); trapped, 24th August (C. I. Husband, K. T. Standring, M. A. Stewart).

Norfolk: Blakeney Point, 4th September (B. A. E. Marr, D. I. M. Wallace *et al.*).

Somerset: Chew Valley Lake, trapped, 15th August, released 16th August (R. J. Prytherch, P. T. Sims, R. F. Thearle *et al.*).

Surrey: Beddington sewage farm, 17th August (P. J. Wilson).

Shetland: Fair Isle, trapped, 5th September (R. Bourne, R. H. Dennis, M. Griffiths *et al.*); another, trapped, 9th to 10th September (R. Bourne, R. H. Dennis *et al.*).

These records bring the total since 1958 to over eighty. Analysis shows that, apart from single occurrences in May and November, all have been between early August and early October. If these seven weeks are broken down into ten-day periods, the resulting groups of records total 6, 11, 14, 20, 16, 8 and 4. This is a remarkably smooth curve of occurrence and it can be argued that this east European and west Asiatic summer visitor has proved itself to be a regular autumn migrant here.

Greenish Warbler (*Phylloscopus trochiloides*)

Northumberland: Bamburgh, trapped, 4th to 7th September (J. M. Bayldon, M. Bell, M. Marquiss).

Isles of Scilly: St. Agnes, 7th to 14th October (J. B. Cox, P. Harrison, D. I. M. Wallace *et al.*).

Sussex: The Crumbles, Eastbourne, 17th September (R. H. Charlwood).

In addition, one was present on Malin Head, Co. Donegal, from 18th to 21st October 1965.

Bonelli's Warbler (*Phylloscopus bonelli*)

Dorset: Portland Bill, trapped, 10th to 20th August (F. R. Clifton, Dr. K. B. Rooke *et al.*).

Isles of Scilly: St. Agnes, trapped, 4th to 5th October (E. Griffiths, P. Harrison, A. Quinn *et al.*).

Although not recorded in Britain before 1948, this species now occurs almost annually, this presumably being linked with its northward spread in Europe.

Arctic Warbler (*Phylloscopus borealis*)

Northumberland: Low Hauxley, trapped, 16th September, released 17th September at Gosforth where it stayed until 18th (B. Little, E. Meek, E. Robson).

Somerset: Sand Point, Weston-super-Mare, 17th August (C. G. Bennett).

This north European and Siberian species, which winters in south-east Asia, has been recorded annually since 1958, except in 1963, but the Somerset record is the first for western Britain since 1960.

Pallas's Warbler (*Phylloscopus proregulus*)

Dorset: Portland Bill, 25th October (A. W. Evans, G. P. Green, D. A. Thelwell).

Isles of Scilly: St. Agnes, 22nd to 23rd October (D. D. Harber, B. S. Milne, A. W. Sudbury *et al.*).

Yorkshire: Spurn, trapped, 24th to 28th October (J. Cudworth, J. B. Hague, B. R. Spence *et al.*); another, trapped, 11th to 13th November (D. L. Davenport, J. W. Hartley, B. R. Spence *et al.*)

There are now 18 British records of this Siberian warbler and all but one have been since 1951. The appearance of this species on St. Agnes, a tiny island some 3,600 miles to the west of its nearest breeding place, for the third consecutive autumn is particularly noteworthy.

Dusky Warbler (*Phylloscopus fuscatus*)

Yorkshire: Spurn, trapped, 26th to 31st October (C. Bower, C. W. Holt, B. R. Spence *et al.*).

This is the fourth British record of this summer visitor to eastern Asia and the third since 1961.

Richard's Pipit (*Anthus novaeseelandiae*)

Isles of Scilly: St. Agnes, 2nd October (E. Griffiths, P. Harrison).

Shetland: Fair Isle, 2nd October (E. J. Wiseman); two, 26th October (G. J. Barnes, R. H. Dennis).

Thus there were considerably fewer records of this summer visitor to central Asia than in 1963 or 1964.

Tawny Pipit (*Anthus campestris*)

Dorset: Portland Bill, 27th September (F. R. Clifton, D. J. Godfrey, A. W. Sudbury *et al.*).

Hampshire: Gilkicker Point, 8th to 11th September (M. Bryant, B. Duffin, M. H. Terry *et al.*).

Kent: Sandwich Bay, trapped, 17th April (D. M. Batchelor, K. Chapman, M. Davenport *et al.*).

Norfolk: Hunstanton, 3rd October (D. M. Broom, M. J. E. Hewlins).

Suffolk: Minsmere, 4th September (H. E. Axell, R. G. H. Cant, P. J. Makepeace); Sizewell, three, perhaps five, 5th September (R. V. A. Marshall); three, 6th to 8th September; one, 9th September (H. E. Axell, R. G. H. Cant, P. J. Makepeace).

Sussex: Langney Point, 22nd September (D. D. Harber). Darwell Reservoir, 6th October (R. V. White).

The number of individuals concerned in the Suffolk records is unprecedented in recent years. Their occurrence was associated with an avalanche of night migrants on the East Anglian coast in the first week of September (to be analysed in a future issue of *British Birds*).

Red-throated Pipit (*Anthus cervinus*)

Isles of Scilly: St. Agnes, 31st October to 4th November (M. I. Harvey, B. S. Milne, A. W. Sudbury *et al.*).

Shetland: Fair Isle, 26th May (E. J. Wiseman); 13th October (G. J. Barnes, R. H. Dennis, E. J. Wiseman).

There is only one previous November record, in 1961, of this summer visitor to north-east Europe and Siberia.

Lesser Grey Shrike (*Lanius minor*)

Dorset: between Bere Regis and Wareham, adult, 23rd August (A. W. and R. A. Preston).

Orkney: North Ronaldsay, found dead, 30th May (K. G. Walker).

Shetland: Sellafirth, Yell, adult, 23rd to 30th September (R. J. Tulloch). Whalsay, adult, 17th to 24th October (Miss W. Dickson, J. H. Simpson, E. J. Wiseman).

Wiltshire: Castle Eaton, 26th to 27th June (M. Latham, J. E. Squire, G. L. Webber *et al.*).

An unusual number of records, exceeded only in 1961 when six were reported. The wide scatter of dates seems to be characteristic of this south and east European and south-west Asian species.

Woodchat Shrike (*Lanius senator*)

Caernarvonshire: Bardsey, 4th to 7th June (G. H. Evans, W. J. Lloyd, Miss G. Marston); juvenile, 12th August (G. H. Evans *et al.*); first-summer ♂, trapped, 12th to 13th August (A. Atkinson, G. H. Evans, R. F. Durman *et al.*).

Cornwall: Marazion Marsh, juvenile, trapped, 28th to 30th August (Rev. J. E. Beckerlegge, R. M. Curber, N. R. Phillips *et al.*).

Dorset: Verne Common, Portland, 6th May (D. C. Moule). Portland, adult, 29th August (Dr. J. S. Ash, D. G. Bell, F. R. Clifton *et al.*).

East Lothian: Barns Ness, adult ♀, trapped, 4th to 15th September (A. Macdonald, A. T. Macmillan, G. Waterston *et al.*).

Fife: Kilconquhar, 30th May (Dr. W. J. Eggeling, D. W. Oliver).

Kent: Dungeness, juvenile, trapped, 22nd August to 13th September (H. A. R. Cawkell, P. J. Grant, R. E. Scott *et al.*).

Norfolk: Happisburgh, 19th May (M. W. Ferguson). Holme, 26th May (P. R. and Mrs. M. R. Clarke).

Northumberland: Farne Islands, 25th to 26th May (F. Y. Bodger). Holy Island, juvenile, 21st to 24th September (L. G. Macfarlane, M. Nattrass, R. Norman *et al.*).

Pembrokeshire: Martinshaven, near Marloes, adult, 9th August (Rev. D. A. Quine, H. Thompson, P. J. M. Ward *et al.*).

Isles of Scilly: Tresco, 2nd June (A. and L. R. Mitchell).

Shetland: Fair Isle, adult ♂, trapped, 23rd May to 7th June (R. H. Dennis, J. Wilson, E. J. Wiseman *et al.*); adult ♂, trapped, 12th August (R. H. Dennis, Mrs. M. T. Dennis, E. J. Wiseman *et al.*). Gremista, Lerwick, immature, 2nd to 5th October (D. Coutts).

Yorkshire: Spurn, 5th June (J. Cudworth, P. E. Preston, B. R. Spence *et al.*).

These 18 records show a continued reversal of the downward trend of the three years 1961-63, during which period there was a total of only ten observations of this summer visitor to western and southern Europe.

Rose-coloured Starling (*Sturnus roseus*)

[Cornwall: Wadebridge, adult, 16th August (Mrs. O. B. Luke).]

As we have stated previously, this species is not uncommonly kept in captivity and there are reasons to suggest that the above individual may well have been an escape. On the other hand, it should be borne in mind that 14 out of the 24 records listed by us since 1958 have been in July and August. These are two of the months most associated with the trans-European wanderings of this nomadic species.

Arctic Redpoll (*Acauthis hornemanni*)

Shetland: Foula, a redpoll showing the characters of this species, 13th to 25th July (H. Fabritius, E. E. Jackson *et al.*). Fair Isle, trapped, 4th to 6th November (G. J. Barnes, R. H. Dennis).

Many birds which have the appearance of Arctic Redpolls show, on examination in the hand, a degree of flecking on the rump or other characters suggesting specific relationship with the Redpoll *A. flammea*. The one on Fair Isle had rump and lower back pure white, but a few black streaks on feathers when lifted; upper tail-coverts white with some black centres; and flanks pure white with a few long black streaks. In addition, it was unusually large, with wing 86 mm., bill 13 mm., tarsus 18 mm. and tail 66 mm. and was found after a severe north-west gale. It was thus one of the purest examples of nominate *hornemanni* (the Greenland form) which has been submitted to

us, but taxonomists are divided about the validity or feasibility of distinguishing the Arctic Redpoll and the Redpoll as separate species. So far as the one on Foula is concerned, it should be mentioned that the inhabitants of this island have the habit of catching small birds in autumn and releasing them in spring. Although enquiries failed to establish such an origin in this case, the possibility cannot quite be excluded in view of the most unusual date.

Serin (*Serinus serinus*)

Cambridgeshire: Cambridge, ♂, 7th to 12th May and then again 5th to 9th July (A. S. Cheke, A. W. Sudbury, Dr. P. Yeo).

Dorset: Portland Bill, 5th July (F. R. Clifton, R. Gyllin).

Hampshire: Beaulieu, ♂, 7th March (J. M. Jones).

Norfolk: Holme, ♂, 23rd August (P. R. and Mrs. M. R. Clarke).

Sussex: Selsey Bill, 15th May (B. A. E. Marr).

Scarlet Rosefinch or Grosbeak (*Carpodacus erythrinus*)

Shetland: Fair Isle, ♀ or first-summer ♂, 9th to 13th June (R. H. Dennis, E. J. Wiseman). Foula, ♀ or first-summer ♂, trapped, 10th to 16th September, and a second one, 14th to 16th September (A. R. Mainwood).

Yorkshire: Spurn, ♀ or first-summer ♂, 29th to 30th September (C. Devlin, J. W. Hartley, B. R. Spence *et al.*).

Though Scarlet Grosbeaks are imported and sold as Rosefinches, it seems likely that the above records relate to genuine vagrants from eastern Europe. In addition to these, one was seen on Inishtrahull, Co. Donegal, on 25th September 1965.

White-throated Sparrow (*Zonotrichia albicollis*)

Lancashire: Walney, trapped, 17th June (J. Adam, Dr. R. G. B. Brown, W. H. Tickle *et al.*).

This is the third British record of this common North American species. All occurrences have so far been in spring and one was associated with known assisted passage across the Atlantic.

Black-headed Bunting (*Emberiza melanocephala*)

Pembrokeshire: Skokholm, ♂, 11th May; ♂, 3rd June (Dr. M. P. Harris).

[**Shetland:** Fair Isle, ♂, 29th to 30th June (R. H. Dennis *et al.*). Whalsay, ♂, 1st to 5th May (J. H. Simpson, R. J. Tulloch).]

Like the Red-headed Bunting *E. bruniceps*, this summer visitor to south-east Europe and Asia Minor is kept in captivity, though not to the same extent as the former (which is now no longer on our list). It is worthy of note that Red-headed Buntings appeared at both Fair Isle and Whalsay, Shetland, about the same time as the Black-headed Buntings above, which suggests that the latter also may well have escaped from

captivity. This possibility can by no means be excluded in the cases of those on Skokholm also.

Yellow-breasted Bunting (*Emberiza aureola*)

Shetland: Fair Isle, ♀ or first-winter, 9th September (R. H. Dennis, R. J. Tulloch, E. J. Wiseman *et al.*).

Rock Bunting (*Emberiza cia*)

Yorkshire: Spurn, 19th February to 10th March (J. Cudworth, R. G. Preston, B. R. Spence *et al.*).

The fifth British record and the first since 1958. Though it breeds as close to Britain as western Germany, it is mainly resident and any migration is chiefly altitudinal.

Rustic Bunting (*Emberiza rustica*)

Outer Hebrides: South Uist, ♂, 7th May (Dr. W. J. Eggeling, D. Lea, G. Waterston *et al.*).

Isles of Scilly: St. Agnes, ♂, 21st October (D. D. Harber); ♂ (from the description probably the same individual), 28th October (B. S. Milne).

Shetland: Fair Isle, adult ♂, 30th April to 1st May (R. H. Dennis, J. Wilson, E. J. Wiseman); 5th October (R. H. Dennis).

Apart from 1961, this north Eurasian bunting has been recorded annually since 1958. The British records for the last eight years total 25.

Little Bunting (*Emberiza pusilla*)

Essex: Hamford Water, Walton-on-Naze, 5th October (R. V. A. Marshall).

Lancashire: Walney Island, 22nd September (A. J. Mercer).

Isles of Scilly: St. Agnes, 20th to 21st October (J. A. Bertenshaw, D. D. Harber, A. W. Sudbury).

Shetland: Fair Isle, trapped, 16th to 21st September (R. H. Dennis, E. J. Wiseman *et al.*).

Although most records of this north-east European and Siberian species still come from islands, observations on the mainland have become more frequent since 1958 and now total eight in that period.

Supplementary 1958 record and correction

Gyr Falcon (*Falco rusticolus*)

Inverness-shire: Kingussie, found dead, end of April or beginning of May (C. C. I. Murdoch).

Snowy Owl (*Nyctea scandiaca*)

(Correction): The locality of the one seen on 22nd February was wrongly given as Corse Maul, Banffshire (*Brit. Birds*, 57: 278); it was actually seen in Glen Esk, Angus.

*Supplementary 1961 record***Pectoral Sandpiper** (*Calidris melanotos*)

Shetland: Foula, two, one trapped, 31st August to 7th September (J. F. W. Bruhn, P. J. Mawby).

Although this species is no longer on our list, we continue to publish additional records for past years.

*Supplementary 1962 record***Lesser Grey Shrike** (*Lanius minor*)

Orkney: Finstown, first-winter, 11th November (E. Balfour).

*Supplementary 1963 records and correction***Little Egret** (*Egretta garzetta*)

(Correction): The one on St. Mary's, Isles of Scilly, was seen 3rd to 30th April, not 8th to 20th April as published (*Brit. Birds*, 57: 264).

Gyr Falcon (*Falco rusticolus*)

Breconshire: Cefn Coch Mountain, 23rd December (M. E. Smith).

Killdeer (*Charadrius vociferus*)

Isles of Scilly: St. Martin's, at least two, 19th November to at least 16th January 1964 (Miss N. Stevens, R. Stevens *et al.*).

Most of the British and Irish records of this North American species have been between November and early April. It should be remembered that one was present at Egginton sewage farm, Derbyshire, from 29th February to 22nd March 1964 (*Brit. Birds*, 58: 360).

Pratincole (*Glareola pratincola*)

Orkney: South Ronaldsay, 6th October (H. McKenzie).

Bee-eater (*Merops apiaster*)

Middlesex: Staines Reservoir, 30th April (Dr. A. D. Prowse).

*Supplementary 1964 records and corrections***Glossy Ibis** (*Plegadis falcinellus*)

Cornwall: Wadebridge, 31st December, perhaps earlier (G. McD. Warner); this bird stayed well into 1965 (see page 285).

Ferruginous Duck (*Aythya nyroca*)

Yorkshire: Bretton Park, 20th December (J. E. Dale, G. Taylor, R. W. Kaye).

Gyr Falcon (*Falco rusticolus*)

Isles of Scilly: Treseo, 6th November to 5th January 1965 (see also page 287) (D. R. Hunt, D. Sedgwick, F. Wardle *et al.*).

(Correction): We learn from H. O. Bunce that a Gyr Falcon came aboard a Hull trawler off Bear Island and was handed over to the Hull R.S.P.C.A. on 11th August 1964; it was released at Bempton, Yorkshire, on 12th August. It seems very likely that this was the same individual as that recorded at Preston, Lancashire, on 25th August (*Brit. Birds*, 58: 359) and we therefore now consider that this record should be square-bracketed.

Red-footed Falcon (*Falco respatinus*)

(Correction): We now learn that the one recorded on Unst, Shetland, on 19th May (*Brit. Birds*, 58: 359) remained until 29th May.

Killdeer (*Charadrius vociferus*)

Isles of Scilly: St. Martin's, the two listed above among the supplementary 1963 records stayed until at least 16th January.

Long-billed or Short-billed Dowitcher (*Limnodromus scolopaceus* or *griseus*)

Flintshire: Shotton Pools, 21st June to 12th November (E. J. Abraham, C. G. Bennett, J. R. Mullin *et al.*).

White-winged Black Tern (*Cblidionias leucopterus*)

(Correction): The date of the one at Brownsea Island, Poole Harbour, Dorset, was incorrectly given as 15th June (*Brit. Birds*, 58: 362); it should have been 3rd June.

Gull-billed Tern (*Gelochelidon nilotica*)

Northumberland: Hauxley, 26th July; two, 1st August (B. Little, E. Robson).

Snowy Owl (*Nyctea scandiaca*)

Aberdeen/Banffshire: Cairngorms, 5th June (S. Roberts).

Moray Basin: 15th November, then ♂ identified from 21st November and ♀ from 23rd; both stayed on into 1965 (see page 291).

Suffolk: near Shingle Street, mid-January (Miss N. V. Pierce Butler, Lady Prestige).

Woodchat Shrike (*Lanius senator*)

Devon: Lundy, 26th May (M. Jones, A. J. Vickery).

OTHER 1964 CORRECTIONS

Gyr Falcon. Under Lancashire, for G. Blackwekk, read G. Blackwell.

Dusky Warbler. Under Isles of Scilly, for P. C. Chance, read P. C. Bance.

Appendix 1. List of 1965 records rejected

This list contains all 1965 records which were rejected after circulation to the Committee. It does not include (a) records withdrawn by the observer(s), without circulation, after discussion with the Hon. Secretary; (b) records which, even if circulated, were not attributed by the observer(s) to any definite species; or (c) a few records which were mentioned in 'Recent reports', but of which we have been unable to obtain full details and which have therefore not been considered.

So far as the following rejected records are concerned, it must be made clear that only in a very few cases are we satisfied that a mistake was made. In the vast majority of instances the record has not been accepted because we were not quite convinced, on the evidence before us, that the identification was correct.

Albatross sp.	Low Hauxley, Northumberland, 19th September
Frigate-bird sp.	Low Hauxley, Northumberland, 19th September
Cory's Shearwater	Bardsey, Caernarvonshire, 9th September
	St. Ives Island, Cornwall, 1st November
	Portland Bill, Dorset, two, 17th April, and two, 26th April
	Isle of May, Fife, 3 1st August
	off Fishguard, Pembrokeshire, 25th September
	Low Hauxley, Northumberland, 21, 19th September
Purple Heron	Stodmarsh, Kent, 21st June
	Swindon, Wiltshire, 1st September
Little Egret	Sidlesham, Sussex, 6th June
Great White Heron	Grove Ferry, Kent, 12th June
Little Bittern	Oxwich, Glamorgan, 14th July
American Bittern	Blagdon, Northumberland, 17th January
Harlequin	Fareham, Hampshire, 19th January
Steller's Eider	Lowestoft, Suffolk, up to two, 3rd to 17th June
Gyr Falcon	Lunan Bay, Angus, 24th January
Red-footed Falcon	Clumber Park, Nottinghamshire, 8th August
Baillon's Crake	Chew Valley Lake, Somerset, 21st October
Little Crake	Holme Pierrepont gravel pits, Nottinghamshire, 30th November
Dowitcher sp.	Tynninghamc, East Lothian, 17th August
Great Snipe	Perry Oaks, Middlesex, 4th September
	Beddington sewage farm, Surrey, 1st September
Solitary Sandpiper	Beddington sewage farm, Surrey, 25th and 26th August
Lesser Yellowlegs	Ynys Tewyn, Caernarvonshire, 17th August
Least Sandpiper	Tresco, Isles of Scilly, 24th to 25th August
Baird's Sandpiper	Dozmary Pool, Bodmin Moor, Cornwall, 27th to 28th September
	Marazion Marsh, Cornwall, 20th to 21st October
	Dungeness, Kent, 6th to 9th September
	(accepted as a Semi-palmated Sandpiper)

RARE BIRDS IN GREAT BRITAIN 1965

Buff-breasted Sandpiper	Tring, Hertfordshire, 30th August
Pratincole	near Brandeston, Suffolk, 15th September
Great Black-headed Gull	Birling Gap, Beachy Head, Sussex, 1st May
Bonaparte's Gull	King George VI Reservoir, Staines, Middlesex, 20th June Porto Bello, Brighton, Sussex, 18th September
Slender-billed Gull	Sandwich Bay, Kent, 30th August to 9th September
White-winged Black Tern	Gilkicker Point, Hampshire, 18th July Tring Reservoirs, Hertfordshire, 2nd May Cliffe, Kent, 9th October Grantham sewage farm, Lincolnshire, 18th September Queen Mary Reservoir, Staines, Middlesex, 22nd August Wooltack Point, Pembrokeshire, 14th September
Gull-billed Tern	Dungeness, Kent, two, 1st May Tresco, Isles of Scilly, 15th September Birling Gap, Beachy Head, Sussex, two, 23rd May
Caspian Tern	Minsmere, Suffolk, two, 9th May
Alpine Swift	St. John, Cornwall, 29th September
Calandra Lark	Gibraltar Point, Lincolnshire, 2nd to 3rd October South Gare, Yorkshire, 3rd October
Lesser Short-toed Lark	Cley, Norfolk, 21st November
Nutcracker	Chesil Bank, Dorset, eight, 6th September Marlborough, Wiltshire, 20th March
Wallcreeper	Tunbridge Wells, Kent, 31st May
Dusky Thrush	Helensburgh, Dunbartonshire, 6th March
White's Thrush	North Ronaldsay, Orkney, 1st October Tresco, Isles of Scilly, 3rd to 5th November
Desert Wheatear	Slapton, Devon, 24th August
Black-eared Wheatear	London Airport, Middlesex, 4th May
Cetti's Warbler	Stodmarsh, Kent, 12th September
Great Reed Warbler	Verne Common, Dorset, 13th August
Aquatic Warbler	Chew Valley Lake, Somerset, 24th July and 25th September
Greenish Warbler	Anderby Creek, Lincolnshire, trapped, 10th to 16th October
Arctic Warbler	Clapham Common, London, 10th October
Collared Flycatcher	Salhouse, Norfolk, 4th September
Richard's Pipit	Clodsey Point, St. Ives, Cornwall, 10th April Ham Green, Kent, 30th August Perry Oaks sewage farm, Middlesex, 22nd July Cley, Norfolk, 27th September Low Hauxley, Northumberland, 25th September Pitsford Reservoir, Northamptonshire, 23rd March Long Ashton, Bristol, four, 3rd April Langney Point, Sussex, 7th March

Tawny Pipit	Buckhurst Hill, Essex, 28th August Isle of May, Fife, 7th September Regent's Park, London, 22nd May Salthouse Marsh, Norfolk, two, 24th October Spurn, Yorkshire, 15th May
Red-tailed Shrike	Benacre, Suffolk, 7th September
Serin	Portland Bill, Dorset, 26th October Isle of May, Fife, 6th September Brean Down, Somerset, 8th May Selsey Bill, Sussex, 17th October
Yellow-breasted Bunting	Skokholm, Pembrokeshire, 16th September
Little Bunting	Glen Lethnot, Angus, 6th April Freathy Cliff, near Rame Head, Cornwall, 22nd September Sandwich Bay, Kent, 20th September Blakeney Point, Norfolk, 12th September Blakeney Point, Norfolk, trapped, 10th October

Appendix 2. Full list of species which come under the consideration of the Rarities Committee

The list which follows is based upon the British and Irish list, but naturally we are also interested in records of species which have not yet qualified for this. We are likewise concerned with a number of well-marked races, e.g. Green-winged Teal, Black-headed Wagtail and Red-tailed Shrike. But sight records of these (including ones examined in the hand and then released) are accepted only as 'showing the characters' of the race in question; we regard museum examination and comparison with skins as the only method of determining even well-marked races with certainty.

White-billed Diver	Night Heron	Ruddy Shelduck
Pied-billed Grebe	Little Bittern	Lesser White-fronted
Black-browed Albatross	American Bittern	Goose
Wilson's Petrel	White Stork	Red-breasted Goose
Madeira Petrel	Black Stork	Egyptian Vulture
Frigate Petrel	Glossy Ibis	Griffon Vulture
Little Shearwater	Flamingo	Spotted Eagle
Audubon's Shearwater	Black Duck	Black Kite
Cory's Shearwater	Baikal Teal	White-tailed Eagle
Bulwer's Petrel	Blue-winged Teal	Pallid Harrier
Kermadec Petrel	American Wigeon	Gyr Falcon
Collared Petrel	Ring-necked Duck	Red-footed Falcon
Capped Petrel	Ferruginous Duck	Lesser Kestrel
Magnificent Frigate-bird	Bufflehead	Crane
Purple Heron	Surf Scoter	Sora Rail
Little Egret	Harlequin	Baillon's Crake
Great White Heron	Steller's Eider	Little Crake
Squacco Heron	King Eider	American Purple Gallinule
Cattle Egret	Hooded Merganser	Great Bustard

RARE BIRDS IN GREAT BRITAIN 1965

Little Bustard	Scops Owl	Booted Warbler
Houbara Bustard	Eagle Owl	Orphean Warbler
Sociable Plover	Snowy Owl	Sardinian Warbler
Killdeer	Hawk Owl	Subalpine Warbler
Caspian Plover	Tengmalm's Owl	Rufous Warbler
Lesser Golden Plover	Nighthawk	Greenish Warbler
Long-billed Dowitcher	Red-necked Nightjar	Bonelli's Warbler
Short-billed Dowitcher	Egyptian Nightjar	Arctic Warbler
Great Snipe	Alpine Swift	Pallas's Warbler
Upland Sandpiper	Needle-tailed Swift	Dusky Warbler
Eskimo Curlew	Bee-eater	Radde's Warbler
Solitary Sandpiper	Blue-cheeked Bee-eater	Brown Flycatcher
Greater Yellowlegs	Roller	Collared Flycatcher
Lesser Yellowlegs	Calandra Lark	Alpine Accentor
Spotted Sandpiper	Bimaculated Lark	Richard's Pipit
Marsh Sandpiper	White-winged Lark	Tawny Pipit
Terek Sandpiper	Short-toed Lark	Pechora Pipit
Least Sandpiper	Lesser Short-toed Lark	Red-throated Pipit
Baird's Sandpiper	Crested Lark	Citrine Wagtail
White-rumped Sandpiper	Red-rumped Swallow	Lesser Grey Shrike
Sharp-tailed Sandpiper	Nutcracker	Woodchat Shrike
Semi-palmated Sandpiper	Wallcreeper	Red-eyed Vireo
Western Sandpiper	Dusky Thrush	Black-and-White Warbler
Buff-breasted Sandpiper	Black-throated Thrush	Yellow Warbler
Broad-billed Sandpiper	Siberian Thrush	Myrtle Warbler
Black-winged Stilt	American Robin	Northern Waterthrush
Stilt Sandpiper	White's Thrush	Yellowthroat
Wilson's Phalarope	Rock Thrush	Rose-coloured Starling
Pratincole	Olive-backed Thrush	Bobolink
Black-winged Pratincole	Grey-cheeked Thrush	Baltimore Oriole
Cream-coloured Courser	Desert Wheatear	Summer Tanager
Ivory Gull	Black-eared Wheatear	Rose-breasted Grosbeak
Great Black-headed Gull	Pied Wheatear	Slate-coloured Junco
Bonaparte's Gull	Isabelline Wheatear	Arctic Redpoll
Slender-billed Gull	Black Wheatear	Citrel Finch
Ross's Gull	Red-flanked Bluetail	Serin
White-winged Black Tern	Thrush Nightingale	Scarlet Rosefinch or
Whiskered Tern	Cetti's Warbler	Grosbeak
Gull-billed Tern	Lanceolated Warbler	Pine Grosbeak
Caspian Tern	River Warbler	Two-barred Crossbill
Sooty Tern	Savi's Warbler	White-throated Sparrow
Bridled Tern	Pallas's Grasshopper	Fox Sparrow
Royal Tern	Warbler	Song Sparrow
Brünnich's Guillemot	Moustached Warbler	Pine Bunting
Pallas's Sandgrouse	Thick-billed Warbler	Black-headed Bunting
Rufous Turtle Dove	Great Reed Warbler	Yellow-breasted Bunting
Great Spotted Cuckoo	Blyth's Reed Warbler	Rock Bunting
Yellow-billed Cuckoo	Paddyfield Warbler	Rustic Bunting
Black-billed Cuckoo	Aquatic Warbler	Little Bunting
	Olivaceous Warbler	

Notes

Weasel dragging fresh corpse of Kestrel.—The following may be of interest in connection with H. G. Hurrell's recent note on a Weasel *Mustela nivalis* killing a Kestrel *Falco tinnunculus* (*Brit. Birds*, 59: 151) and also Mrs. Sybil Selwyn's observation of a Kestrel which caught a Weasel and carried it up into the air but then let it go (*Brit. Birds*, 59: 39).

On 1st September 1962, my father and I were walking over the marshes near Wick St. Lawrence, Somerset, when we came across a Weasel dragging a Kestrel through the grass. Intrigued, we followed it with its strange burden, but it then apparently took fright and dropped it. We went up to the body and found it to be a freshly dead male Kestrel in perfect condition except for a wound at the back of its head. As we did not observe the beginning of this episode, I cannot be sure that the Kestrel was killed by the Weasel, but I now assume that, as in the case described by Mr. Hurrell, it had been caught off guard on the ground by the pugnacious little mammal.

RICHARD PRICE

Coot eating Black-headed Gull's egg.—On 12th May 1966, at Fairburn Reserve, near Castleford, Yorkshire, I was watching several pairs of Black-headed Gulls *Larus ridibundus* which had nests about 30 yards away from me in an area of fairly deep water. Some of them began diving down at a Coot *Fulica atra* which approached one of the nests and apparently started to take material from it, presumably for its own nest. Then I saw the Coot deliberately remove an egg and begin to eat it; the yolk was clearly visible adhering to its bill. After a few seconds the egg sank, however, and the Coot was unsuccessful in several attempts to recover it.

M. DENSLEY

[*The Handbook* notes that Coots have been seen taking eggs of Great Crested Grebe *Podiceps cristatus* and we have records of their eating those of Little Grebe *P. ruficollis*, Moorhen *Gallinula chloropus*, Pheasant *Phasianus colchicus* and Mallard *Anas platyrhynchos*. Probably this behaviour is not uncommon, but there appear to be few published accounts of it and this particular observation is of interest in that it involved successful predation in the face of concerted attacks by a colonial species.—Eds.]

Turnstones feeding on human corpse.—On 2nd February 1966, whilst walking along a beach in south-west Anglesey, I saw five Turnstones *Arenaria interpres* and a Carrion Crow *Corvus corone* feeding on what I at first took to be a pig washed up by the tide and partly covered by wind-blown sand. When I reached the object, however, I discovered that it was a human corpse which had been in the water for some considerable length of time. The birds had been feeding on the facial muscles and the neck. I should perhaps add that I actually saw the Turnstones tearing off small shreds of flesh after the Carrion Crow had removed some bigger pieces; there was therefore no doubt that they were feeding on the corpse itself and not on sandhoppers or other invertebrates attracted to this food source. A. J. MERCER

[In recent years we have published records of Turnstones feeding on animal remains, ranging from the carcasses of birds and a Wolf *Canis lupus* in arctic Canada (*Brit. Birds*, 55: 241-243) to those of a sheep and a probable cat in Britain (*Brit. Birds*, 58: 438; 59: 39). The above rather gruesome account seems to be the ultimate in necrophagous behaviour, however, and we think that it is now sufficiently established that Turnstones will probably turn to any animal carrion when the opportunity occurs.—EDS.]

An indication of the food of the Short-eared Owl in Ireland.—The Short-eared Owl *Asio flammeus* is an uncommon but by no means rare winter migrant in Ireland. In Great Britain, according to *The Handbook*, its principal prey is the Short-tailed Vole *Microtus agrestis*. This mammal does not occur in Ireland.

In 1964 and 1965 I obtained a few Short-eared Owl pellets from four areas in Ireland: North Bull Island, Dublin; East Twin Island, Belfast; Roe Island, Strangford Lough, Co. Down; and Garry Bog, Dervock, Co. Antrim. I also had an opportunity to examine the bones dissected from some pellets collected at Tullykevin, Ballywalter, Co. Down, in 1959. The total prey amounted to 27 Brown Rats *Rattus norvegicus*, 16 Wood Mice *Apodemus sylvaticus*, eleven small birds, six House Mice *Mus musculus*, one Pygmy Shrew *Sorex minutus* and one Rabbit *Oryctolagus cuniculus*.

The Brown Rat thus appears to be the staple food of this owl in Ireland. The localities mentioned are either coastal or boggy and undoubtedly have large populations of Brown Rats. The second most common prey item, the Wood Mouse, can be regarded as of only minor significance since it is relatively much smaller than a rat. The scarcity of Wood Mice on damp ground and their nocturnal habits, in contrast to those of this largely diurnal owl, go far to explain the small numbers

consumed. So far as is known, the Wood Mouse is the most important prey of the only two resident Irish owls, the Barn Owl *Tyto alba* and the Long-eared Owl *Asio otus*, which are both far more nocturnal.

I should like to thank Miss M. McMillan and W. Annet, A. Benington, R. Millar and W. Stewart for assistance in obtaining pellets.

J. S. FAIRLEY

Swifts mating in mid-air.—At 14.15 GMT on 18th May 1966, at Cottingham, Yorkshire, my attention was drawn to two Swifts *Apus apus* which were gliding very close together into a force 2 westerly wind at a height of 250 to 300 feet; the temperature was 12° C. They were flying so slowly as to be almost hovering and during the next four minutes they mated three times. On each occasion the presumed male, which was flying at a distance of only one to two feet from the female, approached from behind, almost hovered over her and then lowered himself slowly down on to her. During the actual mating the wings of both were at an angle of 10-15° below the horizontal, the male appearing to hold his down on to those of the female, and the pair went into a shallow dive. Each mating lasted for some eight to ten seconds. After the first and second times the male broke away and continued flying close to the female, but after the third the pair separated and started hawking for insects. I heard no calls throughout the whole episode.

ANDREW PATERSON

[Aerial copulation has repeatedly been recorded among Swifts (see David Lack, 1956, *Swifts in a Tower*), but we are publishing this record because of the unusually full details.—Eds.]

Jackdaw collecting hair from live deer.—On 4th May 1966, in Greenwich Park, London, I watched a Jackdaw *Corvus monedula* collecting hair from the back of one of a herd of Fallow Deer *Dama dama*, presumably for nest lining as it eventually flew off with a beakful towards a place where several pairs were breeding. The deer remained absolutely motionless while the Jackdaw was on its back and carried on feeding with the rest of the herd only when the bird had left.

Although I have frequently seen Magpies *Pica pica* and Starlings *Sturnus vulgaris* on the backs of sheep, presumably searching for parasites, this behaviour was new to me. However, Mr. Murray, the Park Superintendent, tells me that he has quite commonly seen both Starlings and Jackdaws collecting hair in this way. After the event, it seems extraordinary that this kind of nest material is not exploited more commonly, particularly as the hair could be collected very easily at that time of year when the deer are shedding their winter coats.

P. J. GRANT

[Derek Goodwin regards this as quite common behaviour, particularly in Richmond Park, London, wherever Jackdaws and deer are in the same place at the right time and he has also seen as many as four to eight Jackdaws collecting hair from a recumbent cow. In addition, we have records of Jackdaws collecting hair from sheep and ponies, and Dr. N. Tinbergen informs us that he often used to see this behaviour with donkeys, ponies and bullocks in the Netherlands; this was always at times when the mammals were shedding a lot of hair and they did not seem to object at all.—EDS.]

Magpie killing and eating Song Thrush.—At about 10 a.m. on 28th April 1966, from my office at Ashford Hospital, Middlesex, I saw a Magpie *Pica pica* attacking a Song Thrush *Turdus philomelos* on the lawn some 50 yards from me. The Magpie was being mobbed by several Blackbirds *T. merula*, House Sparrows *Passer domesticus* and Dunnocks *Prunella modularis*, and the Song Thrush was also attempting to fight back at it, but after about a minute the Magpie had pecked the Song Thrush severely, forced it to the ground, stood on it and begun stabbing it viciously with its beak. In the early stages of the attack the other birds mobbing the Magpie kept up incessant alarm calls, but it was noticeable that once the Song Thrush was obviously doomed they all abandoned it and returned to feeding on the lawn. When the Song Thrush was still not quite dead, the Magpie carried the body in its beak to the shelter of a garden seat and proceeded to pluck and eat it. The Magpie was evidently feeding young and flew off several times with beakfuls of flesh until only feathers were left. The next morning I saw House Sparrows and Dunnocks collecting these for their nests.

I should perhaps add that I could not be sure at that distance that the Song Thrush was an adult, but it was certainly not a newly fledged juvenile and I do not think it was a bird of the year as I watch the birds daily on these lawns and at that date no young of any species had appeared there. Nor do I think that it was sick or injured as it seemed to defend itself very strongly until it was finally overpowered by the much bigger Magpie.

ELIZABETH J. BOOG

[In spite of Mrs. Boog's belief that the Song Thrush was not injured or ill, we think that this is still a strong possibility. Magpies and Carrion Crows *Corvus corone* react to the slightest suggestion of weakness and tend to attack birds that appear in any way sub-normal or show the least sign of injury, such as unco-ordinated movements or unnatural fluttering.—EDS.]

Reviews

Handbuch der Vögel Mitteleuropas. 1. Gaviiformes-Phoenicopteriformes. Produced by G. Niethammer with K. Bauer and U. Glutz von Blotzheim. Akademische Verlagsgesellschaft, Frankfurt am Main, 1966. 483 pages: 70 line drawings and maps. DM 48.00 (subscription price as part of entire work DM 40.80).

After J. F. Naumann's great *Naturgeschichte der Vögel Mitteleuropas* exhausted its serviceability early in this century, Dr. Ernst Hartert inspired the preparation of a handbook of German ornithology as its successor and work on this was started by a strong team in 1913. Unfortunately, the First World War soon overtook it and the editor and driving force, Dr. Otto Le Roi (perhaps better known by his Teutonic name of A. F. Koenig for his *Avifauna Spitzbergensis*), was killed on the Carpathian front in October 1916. Efforts to restart the work after the war did not succeed and it was only after the fruitful interchange of experience at the 8th International Ornithological Congress at Oxford in 1934 that the Congress President, Dr. E. Stresemann, himself a survivor of the 1913 team, was able to arrange for Dr. G. Niethammer to undertake a freshly designed work, which was intended 'für Deutschland ein Buch zu schaffen, wie es die Engländer seit über zehn Jahren in *Practical Handbook* besitzen . . .'

Although Dr. Niethammer discharged his mission with exemplary skill and thoroughness by completing the *Handbuch der Deutschen Vogelkunde* in three volumes, their appearance in 1937, 1938 and 1942 led to much of their impact internationally being lost during the Second World War, especially since the work rapidly went out of print, while the simultaneously issued *Handbook of British Birds* by H. F. Witherby and his colleagues held the field. Moreover, the stress laid in both works on gaps in knowledge and the vast post-war growth of ornithological studies quickly fulfilled the wish expressed in Dr. Stresemann's Introduction: 'Möge es also . . . bald veraltet sein!'

Facing realistically the fact of its obsolescence, Dr. Niethammer and his present collaborators have also resolved to break out from the narrow framework of German political boundaries and to bring in neighbouring countries in this new *Handbuch der Vögel Mitteleuropas*, which is mainly the work of an Austrian, Dr. Bauer, and a Swiss, Dr. Glutz von Blotzheim. It covers all species recorded in the Netherlands, Belgium, Luxembourg, Germany, Switzerland, Austria, Czechoslovakia and Hungary, and introduces new sections concerned with ecology, population dynamics and behaviour, but abandons treatment of parasites. The fact that this first volume requires nearly 400 pages of highly condensed text to deal with the first 44 species is

an indication of the depth of treatment, while the thoroughness and accuracy of the contents is naturally first-class. It is envisaged that ten more volumes will be needed to complete the work for which, very prudently, no timetable is given.

By the accident of taxonomy, this first volume includes a high proportion of marine species which are far from characteristic of the almost entirely hinterland region of Europe included by the authors in 'Mitteleuropa', even though that region somewhat surprisingly is held to extend to within some fifty miles of Kent. The White-billed Diver, Wandering Albatross, Great Shearwater, Gannet and Flamingo are described with admirable thoroughness, but do such stragglers to 'Mitteleuropa' really merit so much space here, including in the case of the Flamingo six out of the volume's 70 illustrations? Apart from the improbability of observing these birds, this policy inevitably means that in such cases chief reliance must be placed on the work of ornithologists from outside the region whose results are more readily accessible elsewhere. It must, however, be conceded that the excellence of the editing may well lead a foreign reader to consult this *Handbuch* for a concise and authoritative treatment even in such cases, while there seems no ground for supposing that full presentation of German and kindred ornithological results has thereby been curtailed. For instance, the White Stork, a species most thoroughly studied in Germany, gets 27 pages of treatment, including one of display illustrations and four maps or charts. The Black Stork gets a dozen pages, as does the Little Bittern, and the Black-necked Grebe gets eight. The authors explain that contrasting degrees of fullness in the treatment of species mirror contrasting states of more or less adequate information about them.

Following basically the sequences of Dr. A. Wetmore and J. L. Peters and using a key system based on that developed by Dr. Ernst Hartert for *The Handbook of British Birds*, the authors begin each specific account with a note of the world distribution and of recognised subspecies. A terse outline of field characters is followed by a plumage description which includes detailed information on soft parts and by a range of measurements and weights from different areas. Moults, voice, breeding range, distribution in 'Mitteleuropa', population, migrations, habitat, density, reproduction, breeding success, mortality, longevity, behaviour, food, and a summary of literature complete the account. For each order and family there is also an introductory summary, while nearly 30 pages are devoted to a comprehensive select review of the basic literature arranged by subjects. There is also a critical presentation of the criteria and procedure followed in each section.

The authors are to be congratulated on bringing the existing model

of a comprehensive ornithological handbook to a remarkably advanced state of development. Given that coloured plates are dispensed with, and that the line illustrations are somewhat limited, it is difficult to see how the specific task which they have set themselves could have been better performed, and it is to be hoped that they will be able to keep up the performance without flagging; to do this they will need something of the luck which their predecessors were denied. The printing and production are admirably serviceable, the only obvious fault in the review copy being the very odd one of reprinting page 82 on the Black-throated Diver in place of page 482 listing German names. Many ornithologists who do not read German will find increasing cause to regret the fact as future volumes appear.

E. M. NICHOLSON

A Field Guide to the Birds of Britain and Europe. By Roger Peterson, Guy Mountfort and P. A. D. Hollom. Revised and enlarged edition in collaboration with I. J. Ferguson-Lees and D. I. M. Wallace. Collins, London, 1966. 1,200 illustrations, 670 in colour; 384 distribution maps: 384 text pages. 30s.

It is not usual for us to review a revised edition of a work already fully reviewed, as this one was in *Brit. Birds*, 57: 62-64. But then this is not a usual book, having meanwhile sold a reputed quarter-of-a-million copies in nine reprints and in eleven languages, and having left an indelible mark on the recent growth of European ornithology, comparable with that of Roger Peterson's *Field Guide to the Birds of North America*, on which its system is based.

Superficially, the new version is not conspicuously different. It has about 27 more pages of text and two more of coloured plates, including one species, the Palm Dove, which through its foothold in European Turkey is newly admitted to the list, as is the Chukor which appears in a black-and-white sketch. It adds full descriptive treatments and colour plates for 20 other species previously relegated to the summary of Accidentals (to which, however, about as many more have since been admitted). These promotions include two species, the Isabelline Wheatear and the Cinereous Bunting, which have both been found breeding regularly in Europe (Greece) within the last decade.

The scientific order of families now follows the *Check-List of Birds of the World* by J. L. Peters and his successors, while nomenclature and the order within each family is based on Charles Vaurie's *The Birds of the Palearctic Fauna* (1959-65), thus meeting criticisms which we made of the original edition. The field observer will find it irksome, however, to have to digest yet another major reshuffle, aggravated in some cases by the adoption of novel English as well as scientific

names. For example, the Rufous Warbler becomes at one fell swoop the 'Rufous Bush Chat' and a member of the genus *Cercotrichas* instead of the former *Agrobates*. The Scarlet Grosbeak also reappears without a word of explanation as the 'Scarlet Rosefinch'. Another unpalatable feature is the lumping together in one vast agglomeration of what were once the thrushes and chats, the warblers, the goldcrests, and the flycatchers, plus the unfortunate former Bearded Tit which is now brigaded with the thrushes as the 'Bearded Reedling'.

While the authors could hardly have done anything but adopt these courses, they would have been wise to explain the changes, if necessary by a new section replacing the now redundant piece on 'The Problem of Subspecies'. Such an explanation might also have covered the dubious new device of grouping warblers as 'swamp warblers', 'scrub warblers', 'leaf warblers' and 'tree warblers'. Just why the more arboreal Blackcap is a 'scrub warbler' and the less arboreal Garden Warbler a 'tree warbler', while the highly arboreal Wood Warbler becomes merely a 'leaf warbler', will be obscure to many observers, who will question the 'convenience' of superimposing this gratuitous extra complication on the many already imposed by the taxonomists.

The keen non-specialist user of the *Field Guide* will look for compensation for these trials in improvements commensurate with the great advances in knowledge of field characters and in identification techniques made during the past dozen years. He will, no doubt, ask how different, and where different how much improved, is this new version. He may also wonder how nearly it is today, as it undoubtedly was on its original appearance, the best work for its purpose which could reasonably be expected to be produced in the light of current techniques and information.

There can be no simple or clear-cut answer to these questions, since the multifarious changes are so largely in fine detail. Perhaps an exception can be made for the distribution maps, whose original shortcomings have provoked a great volume of corrective observation and analysis now brought to fruition in a redrawn and much more authoritative series. The usefulness of these, however, continues to be limited by their very small scale and by the necessity for treating regions where a species is thinly distributed identically with those where it is dominant. As regards other aspects, it seemed best for the purposes of this review to take the new edition into the field with an early one (that of 1956) and to try it out on a sample of species likely to be of special interest to a normal user. This was done recently in Switzerland, the species selected being the Black Kite, Goshawk, Wryneck, Alpine Accentor, Bonelli's Warbler, Pied Flycatcher (in relation to Collared), Willow Tit (in relation to Marsh), Citril Finch and Snow Finch.

In some of these cases the field description was virtually unchanged. This applied, for example, to the Snow Finch, which appeared adequate on all points, and the Alpine Accentor, where the picture (identical in both editions) seemed to present an uncharacteristic stance, upright like a House Sparrow instead of flexed back in a shuffling attitude as in the miniature Dunnock alongside; legs in the field showed deep coral red, not yellowish as illustrated. The Willow Tit, also unchanged except that the reproduction of the plate was marginally more accurate, was satisfactory so far as plumage goes and the previously weak song description was corrected, but the treatment of voice would leave a new observer puzzled to distinguish the 'deep, nasal "tchair"' of the Marsh from the 'nasal, buzzing "eez-eez-eez"' and the 'loud "chay"' of the Willow. These sections seemed unsatisfactory, as did the description of habitat where the regional montane preference of the Willow is ignored. For the Pied Flycatcher nearly all the spring males seen were brown not black, a plumage not allowed for either in picture or text. For the Black Kite the slightly revised description still retains an over-emphasis on the 'much less forked tail', a character which can easily be misleading to observers unfamiliar with the species in many practical situations; the habitat section is also unsatisfactory.

In other cases there are changes which were not necessarily for the better. With the Citril Finch 'yellowish-green' is substituted for 'green' and 'bright yellow under-parts' are added, bringing the general effect nearer to those for the Serin and Siskin, and making the unchanged plate and diagnostic points now inconsistent with the main text. This change seemed for the worse, and the description of the song, which has a marked Goldfinch-like character, was unhelpful. For Bonelli's Warbler also, in this case in the new plate which falls shockingly below the general standard of the work, there is an extreme exaggeration of the yellow element. This time, however, the rather absurd previous suggestion that a yellowish patch on the rump is the best mark has been corrected, and the text description is now quite adequate. The voice section has hardly been improved by adding a rather far-fetched parallel with the songs of the Cirl Bunting and Lesser Whitethroat, and the habitat section wrongly implies that Bonelli's favours denser tree foliage than the Wood Warbler. In the case of the Wryneck, again, the revised description overstresses its long-tailed appearance and imports a voice comparison and a substitution of 'kyeee' for 'kyink' which are not very helpful. The Wryneck, of course, typically utters its note much more than twice in each sequence. Finally, in the case of the Goshawk more stress is now laid on conspicuous white undertail-coverts, a character which seems to be somewhat overplayed, while reference to the spring

soaring flights which so often reveal the bird's presence is only implicit. The wing-shape is better described, however.

Summing up, the text is in many ways improved but the choice of salient field characters is necessarily arbitrary in some cases, and some of the alterations concerning them appear arbitrary too. There is a disturbing possibility that the same bird might be differently identified in some critical cases by observers using the two different versions, owing to varying impressions created by the changes in emphasis, which sometimes seem more definitely expressed than field conditions warrant. Not all birds can be definitely identified in the field, even by experts, even today. The opportunities which now exist for giving more help in terms of voice and habitat have not been taken to the extent which recent advances in knowledge make possible. It is in these directions especially that we must look forward to improvements in a further revision. Meanwhile, this one can be recommended with some qualification as, on balance, a very worthwhile replacement. For their own good name, however, the publishers should take the very first opportunity of bringing the substandard new plates 57, 65 and 66 at least up to the level achieved in the first edition twelve years ago. Their reproduction is simply not good enough.

E. M. NICHOLSON

Letters

Weights of migrant Yellow Warblers in Pennsylvania

Sirs,—With reference to your difficulty in finding published weights of migrant Yellow Warblers *Dendroica petechia* in America to compare with the 9.0 grams of the one recorded on Bardsey Island, Caernarvonshire, in August 1964 (*Brit. Birds*, 58: 457-461), we offer the following data from our banding (ringing) files at Carnegie Museum's Powdermill Nature Reserve (located near Rector, Westmoreland County, southwestern Pennsylvania).

A sample of ten males banded during migration in May averaged 9.6 grams (range 8.5-10.4); six May females averaged 8.9 grams (8.3-9.8). Four August and September migrants (sex unknown, because it is seldom possible to determine the sex with certainty in fall plumage) averaged 9.1 grams (8.7-9.2). All the above weights are from birds which showed no visible fat in the hollow between the neck and breast. In contrast, three autumn migrants with heavy fat deposits weighed an average of 12.4 grams (11.3-13.5).

Among the migrants mentioned above, six (including both sexes) weighed from 8.3 to 8.8 grams, not strikingly heavier than the 8.0 grams post-mortem weight of the British specimen. The 9.0 grams live weight of the latter is a good match for our migrants lacking visible fat. There is nothing in these weights to suggest death by (incipient) starvation. On the other hand, the live weight of the fat-free British specimen, when compared with fat autumn migrants 2.3 to 4.5 grams heavier, does not *in itself* require a hypothesis of assisted passage. It is at least conceivable to us that a small bird, endowed at the beginning of its journey with a fat load of between a quarter and a half of its fat-free weight, might reach the British Isles unassisted, having used up its fuel but not appearing visibly emaciated. It should be pointed out that this species breeds commonly in eastern Labrador and Newfoundland, the North American land areas nearest to Britain.

Incidentally, our banding files now contain records for approximately 32,000 birds of many species, all of which have had the wing measurement taken and about half of which have been weighed at least once. In any future cases of American birds, particularly passerines, being trapped in Britain or anywhere else in Europe we shall be glad to supply comparative weights for the species concerned if the observers write to us at the Carnegie Museum, 4400 Forbes Avenue, Pittsburgh, Pennsylvania 15213, U.S.A.

MARY A. HEIMERDINGER and KENNETH C. PARKES

The death of the Yellow Warbler on Bardsey Island

Sirs,—We are seriously disturbed by some aspects of the report of the first British record of an American Yellow Warbler *Dendroica petechia*, which died on Bardsey Island, Caernarvonshire, at the end of August 1964 (*Brit. Birds*, 58: 457-461). The account of the treatment accorded to this bird is quite beyond belief.

The report indicates that the bird was harried from about 17.30 until 18.20 hours GMT when it was eventually netted ('It succeeded in evading the net on several occasions. . .'). It is also made clear that the bird had probably arrived only that day and therefore its food stores were likely to be low. Furthermore, the driving continued at a time when it should have been obvious that little detailed inspection could have been achieved before dark.

The bird was then handled, weighed, photographed and displayed to visitors at the observatory until the light failed (we note that sunset on this day was 18.53 hours GMT!). Apparently it was then decided to keep it overnight. Was it therefore surprising that this unfortunate creature died the following morning, soon after dawn and *again* in the hand?

The post-mortem showed that the bird had no infection, but had exhausted its food store. It seems clear that the cause of death was shock and starvation resulting from the treatment it had received.

The most perturbing aspect of this incident is the fact that the treatment we condemn was reported in full detail. We can only infer that this type of procedure may be standard practice in similar circumstances—a truly sobering thought.

There can be no justification whatever for this sort of behaviour by bird-watchers, whether for identification or for ringing purposes. In this instance the addition of a new species to the British List has no significance whatsoever when compared with the unnecessary suffering which this bird must have undergone. The whole incident is a disgrace to ornithology in general and observatory work in particular.

C. G. BENNETT

R. HARRISON

L. G. BROOK

J. C. HILLMER

J. G. BROWN

L. P. SAMUELS

S. DOBSON

J. G. SCOURFIELD

H. G. HANCOX

K. G. SPENCER

Sirs,—The unfortunate incident referred to above was fully investigated by the Bardsey Bird and Field Observatory Committee shortly after it occurred and steps have been taken to avoid the possibility of causing similar concern in the future.

It is easy for your correspondents to be wise after the event, but even an expert can be unaware that a bird has exhausted its food reserve; birds are known to be active until almost the moment of collapse. We also think it fair to point out that it could not have been established that the bird was an extreme rarity until after it had been caught and a preliminary examination had been made.

It may reassure your correspondents to learn that the view which they have formed of the course of events is much exaggerated. They have made no allowance of time for the ringing party to reach their destination and set up their nets, to make their first drive and to send for the warden, and for the warden to find and view the bird. In fact, only a few minutes were spent by the warden in catching the bird and the loss of feeding time was well under an hour. The bird would not have fed during the hours of darkness and its chance of survival during this period was probably as high in the observatory as outside.

This committee includes several people who are well known for their bird protection work and they, and their fellow members, are all quite satisfied that the warden is outstanding in his concern and anxiety for the safety of the birds he handles.

W. EIFION JONES, *Chairman*
Bardsey Bird and Field Observatory Committee

The scientific use of B.B.C. wildlife sound recordings

Sirs,—In view of the increasing interest in the study of bird and other animal vocalisations, I should like to remind all serious students of bio-acoustics of the availability of the British Broadcasting Corporation's extensive collection of wildlife sound recordings. The right to consult the collection is *not* limited to the members of particular organisations.

At present a complete set of all the B.B.C. recordings is deposited at the Sub-department of Animal Behaviour, High Street, Madingley, Cambridge (enquiries to Professor W. H. Thorpe) and at the headquarters of the British Trust for Ornithology, Beech Grove, Tring, Hertfordshire (enquiries to the Secretary). New records are automatically sent to these centres as they become available. The British Institute of Recorded Sound is planning to purchase a further set from the B.B.C. and this will be available for study in London (at the B.I.R.S., 29 Exhibition Road, London S.W.7).

All the B.B.C. recordings are on discs; the old twelve-inch 78 r.p.m. discs are now being systematically transferred to seven-inch $33\frac{1}{3}$ r.p.m. ones. The English and scientific names of each species are clearly stated on the labels, plus the type of vocalisation, the place, month and year of recording, and the name of the recordist. More precise details are available, however; indeed, every recording is documented as fully as possible and the information kept on a card index in the Sound Archives Library in Broadcasting House, London. Duplicates of this index are kept in my office at Broadcasting House, Whiteladies Road, Bristol 8, and at Cambridge and Tring.

The main purpose of the B.B.C. collection is to supply recordings for use in B.B.C. programmes and priority must therefore be given to programme needs rather than to zoological interest. However, the B.B.C. recognises the scientific value of many of the recordings in the collection and has made sets available to the centres mentioned above because it cannot set aside facilities on its own premises for research work. I shall be glad to supply on request, if possible, additional information about any recording in the collection.

B.B.C. recordings must not be used for lecture purposes without prior permission from the Corporation. In this category are included any meetings at which an entrance fee is charged; meetings of a natural history society where the recordings are used merely to illustrate a popular lecture with no intention of making any scientifically relevant points; and extramural or similar classes. They may, however, be used at scientific meetings before non-paying audiences at the discretion of the centre supplying the discs. In all cases acknowledgment should be given to the person or persons who made each recording, and to the B.B.C.

J. F. BURTON, B.B.C. Natural History Unit

News and comment

Edited by J. L. F. Parslow

Curious timing of Britain's first bird stamp issue.—Having turned down a request from the organising committee for a special postage stamp to mark the occasion of the 14th International Ornithological Congress in July, the G.P.O. announced that it would be issuing in the middle of the month Britain's first series of bird stamps—and only its second purely 'pictorial' issue. The coincidence appeared a strange one, but it seemed fortunate and appropriate that the stamps would be on sale during Congress week. On 25th May, however, the Postmaster General told Parliament that the date of issue had been put back to 8th August—fully a week after the Congress ended and the many members from overseas had returned home. Britain's first ever 'pictorials', featuring countryside views were issued on 2nd May, immediately after the 1966 National Nature Week had ended. Each of these series of stamps would have been especially appropriate had they been issued a week or two earlier. Their particular timing presumably reflects a desire on the part of the G.P.O. to create a clear distinction between 'commemorative' and 'pictorial' issues.



The bird stamps feature Blackbird, Robin, Blue Tit and Black-headed Gull the reasons for this particular choice being left unexplained by the G.P.O.'s advance publicity) and appear printed in blocks of four 4d. stamps as illustrated here. The artist is J. Norris Wood, who is new to British stamp design. Criticism of the designs should perhaps properly be reserved until the finished eight-colour stamps appear. But the first impressions of many ornithologists are ones of disappointment, particularly in view of the splendid examples of bird design and illustration on some recent stamp series from abroad.

Leading British bird recordist's tragic death.—Susan K. Taylor (1929-1966) died in a road accident in Sweden on 30th May, when the Land Rover she was driving collided with an oncoming ambulance and burst into flames. One of the passengers, Mrs. V. Paulson-Ellis, was also killed. C. W. G. Paulson-Ellis, the

well-known bird photographer, was seriously injured but is recovering. Jeffery Boswall has contributed the following appreciation of Miss Taylor, who was rapidly becoming known as one of Britain's outstanding ornithological sound recordists.

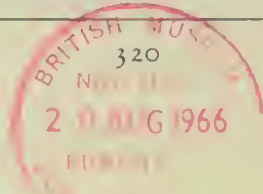
'Susan Taylor inherited her interest in birds from her father who had been one-time president of the Ornithological Section of the Bristol Naturalists' Society. Her particular interests were field identification, ringing and sound recording. She had taped a number of species in Britain, but her main achievements were in Greece, where she recorded well over 70 species, including eight European "firsts". Copies of a dozen of her more important tapes, beautifully documented, had been deposited with the Library of Natural Sounds at Cornell University. It is to be hoped that her other recordings will also be suitably preserved for ornithology. With moral support from Cornell and from the B.B.C. Natural History Unit she won a teacher's grant to tour North Africa and Europe in 1966 with the primary object of collecting sounds for a projected European song guide. While in Greece the party was delayed for Susan to have an emergency operation for acute appendicitis, and during a brief period of convalescence she made valuable observations on the song of the Balkan population of the Olivaceous Warbler.

Susan Taylor was an enthusiastic and gifted teacher; a highly competent field ornithologist, ringer and recordist; and a kind, gracious and perceptive woman. Her like are not common.'

Birds in Northamptonshire.—A duplicated booklet, 'Birds of Northamptonshire' by Brian Webster, has recently been published by the Northamptonshire Natural History Society (2s. 6d. post paid from R. Felton, 1 Tenby Road, Northampton). In the space of 14 pages it provides useful—if very brief—summaries of the status of all species that have occurred in the county since 1946. Many of the county's regular breeding birds are said to have declined or probably declined in recent years, and Black-headed Gull, Wryneck, Red-backed Shrike and Stonechat have disappeared altogether. Almost inevitably, the county has gained Little Ringed Plover and Collared Dove, but, these apart, not one regular breeder is said to have increased. This emphasis on decreasing species may be explained by the fact that the booklet was published to mark National Nature Week. The relatively new Pitsford Reservoir has supplanted the now modernised sewage farm at Ecton as the county's most favoured stamping ground for wader enthusiasts. Constructed in the mid-1950s, the upper half of the reservoir was recently declared a Local Wildfowl Refuge. A sketch map of the county would have been helpful.

Jonathan Sparrow Memorial Prize.—Amateur members of the British Trust for Ornithology who are under 24 years of age may compete for the newly announced 'Jonathan Sparrow Memorial Prize'. The prize is to be awarded every alternate year starting in 1967 and will comprise books to the value of £10. To enter, competitors will be required to submit a paper (suitable for publication in *Bird Study*) which may concern any aspect of bird biology so long as ringing has played an essential part in it.

We regret that D. D. Harber has had to go into hospital for an operation and it will be some months before he can carry on as Hon. Secretary of the Rarities Committee. Meanwhile, another member of the Committee, F. R. Smith, has kindly agreed to take over and all correspondence concerning the Rarities Committee should now be sent to him at Telford, Hill Barton Road, Exeter, Devon. A note will be published when Mr. Harber returns.



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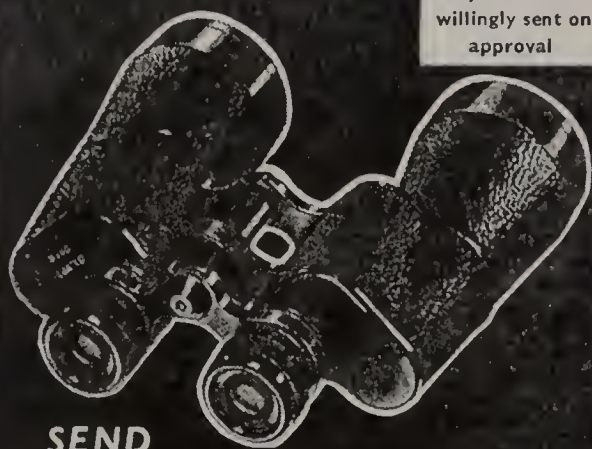
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British Birds

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north-east Scotland

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(with one plate)

British bird-photographers: 7—T. M. Fowler
(with seven plates)

Analyses of Barn Owl pellets from an Irish roost
J. S. Fairley

Notes

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No. 8



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1966

FOUR SHILLINGS



British Birds

AN ILLUSTRATED MONTHLY JOURNAL

Editors Stanley Cramp, I. J. Ferguson-Lees, P. A. D. Hollom, E. M. Nicholson

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British Birds

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AUGUST 1966



Editorial

'The Birds of the Western Palearctic'

RECENT ADVANCES in several fields of biology have been so rapid and so vast that it has become a major task of scholarship to digest not only the facts but the implications and potentialities of the new knowledge in the form of authoritative and comprehensive works of reference, which can both sum up an otherwise unmanageable mass of data and serve as a springboard for further progress.

Until comparatively recently, the part played by ornithology in modern biological progress has tended to be underestimated, but such reassessments as the Royal Society's international symposium on ritualisation have demonstrated how ornithology has formed a main growing point in studies of speciation and evolution, population dynamics, migration and dispersal, navigation and ethology. Among the reasons for this are the almost unique opportunities offered by birds for comprehensive comparative studies in a wild state and the extent to which these opportunities have been seized in a few countries, of which most are in Europe and among which Great Britain is pre-eminent.

While for most plants and animals unresolved problems and incomplete work on taxonomy and description continue to retard other progress, in ornithology there are now substantial areas of the earth where this stage has, in effect, been passed and it is now possible to concentrate effort on less elementary problems and on correlations between distribution, ecology, behaviour, evolution and other significant aspects. If, however, these potentialities are to be fully realised, the entire up-to-date basic knowledge must be carefully reviewed and clearly presented in suitably summarised form for future workers.

Almost thirty years ago, our predecessors as editors of *British Birds*—H. F. Witherby, Rev. F. C. R. Jourdain, N. F. Ticehurst and

B. W. Tucker—produced *The Handbook of British Birds* (1938-41). Its scholarly standard and concise presentation of the then existing knowledge made it a firm basis for countless and diverse advances in ornithological research and it later served as a model for two other works on a much wider geographical basis, *Ptitsy Sovetskogo Soyuza* (Birds of the Soviet Union) under the general editorship of G. P. Dementiev and N. A. Gladkov (1951-54) and the *Handbook of North American Birds* edited by Ralph S. Palmer (1962 and in progress). *The Handbook of British Birds* continues to be reprinted and is in its ninth impression, but, largely through the stimulus it provided, the advance of ornithological knowledge has rendered it out of date, not only in many details, but above all in its basic conception.

As the great success and wide use of *A Field Guide to the Birds of Britain and Europe* has helped to show, a national basis for such works is no longer adequate. The future need is for ornithologies of the main faunal regions and of their principal biogeographic provinces. Some of the more compact sub-regions, such as Fenno-Scandia and Central Europe, are covered by works already published or in progress, but there is no single work filling the great gap of the western Palearctic lying between the areas covered by the Russian and North American works. The present editors of *British Birds* are therefore planning an entirely new work on *The Birds of the Western Palearctic*, aiming to review and to present clearly the basic knowledge of the birds of this much larger area. It will include all Europe west of Russia and also the non-European Mediterranean lands east to Turkey and Jordan and south to about 20° N in Africa, thus with the current American work on the Nearctic and the completed Russian one on the Soviet Union providing coverage of virtually the entire Holarctic, except for the southern fringes of the eastern regions from Iraq and Iran to China and Japan. It is hoped that the result, incorporating the great advances in knowledge in recent years, now scattered and often difficult of access in the journals of many countries, will serve not only as a work of reference both for the professional scientists and for the ever-growing body of amateurs whose range of interests is expanding every year, but will also focus attention on the gaps still remaining in our information and on correlations between different aspects of our knowledge, thus providing a stimulus to further studies.

Such a task, involving a wide synoptic survey combining the results and bringing together the approaches of several European schools of thought into a single more catholic and more comprehensive work, clearly involves a major commitment of both time and money. After consulting the publishers of *The Handbook*, we concluded that the scale of this commitment, and in particular the heavy costs of the preparatory years, called for the backing of one of the great university

publishers, and our thoughts at once turned to the University Press of Oxford, the University which had sponsored the Edward Grey Institute and had been hosts to the 1934 and 1966 International Ornithological Congresses. Our proposals have been received with the utmost friendliness and understanding and the Delegates of the Oxford University Press have declared themselves ready in principle to undertake this immense publishing task subject to the conclusion of detailed editorial and financial arrangements, negotiations for which are now well advanced. It is our intention that the prospective royalty revenue (after the necessary contractual payments in connection with the editorial work) should be devoted to the establishment of a special trust fund, which would be used to further ornithological research and expeditions in the western Palearctic region, especially in those countries where finance for such purposes is at present limited.

The new work will aim to deal with some 700 species of birds, of which about 575 are breeding species or regular migrants in the western Palearctic and the remainder of accidental occurrence. The former group will require, on average, some five pages of text each, including sections on habitat, population and density, territory, display and other aspects of behaviour, reproduction, food, migration and dispersal, mortality and longevity, field-characters, voice, plumages, measurements, subspeciation, weights, moults, and, in some cases, conservation; while the accidentals may be condensed to one or two pages of text apiece, with a number of these sections omitted. In addition, it is intended that each species shall be illustrated with a specially commissioned colour plate, showing the full range of normal plumages together with more distant flight views, and, for the main species, maps showing breeding and wintering areas in Europe, North Africa and the Middle East, with smaller inset maps, where appropriate, to give the world-wide distribution. There will also be colour plates of eggs, black-and-white illustrations where desirable and many text figures showing such features as display postures, recoveries of ringed birds and voice spectrograms. With a glossary, index and bibliography, as well as a number of general chapters, it is expected that the whole work will need seven volumes. The vast amount of preparatory work means that the first volume will not appear until the early 1970's, but it is planned that the remaining volumes will then be published at about ten-monthly intervals.

In order to provide the wide background of knowledge required, specialists from many countries are being invited to serve as associate editors or consultants. The main responsibility for the work will, however, be centred on this country through a specially constituted non-profit organisation, with a small directing board assisted by a rather larger editorial team. The board will consist of the present

editors of *British Birds*—Stanley Cramp, I. J. Ferguson-Lees, P. A. D. Hollom and E. M. Nicholson—and they will be joined on the editorial team by Dr. K. H. Voous, head of the Systematic and Zoogeographic Department of the Zoological Laboratory of the Free University, Amsterdam; Dr. D. W. Snow, Director of Research for the British Trust for Ornithology; and Robert Spencer, head of the Ringing Scheme operated by the British Trust for Ornithology and Secretary-General of Euring, the European co-ordinating committee for ringing.

The International Ornithological Congress in Oxford in July provided an opportunity to explain and discuss the scheme, both informally and at a well-attended special meeting. We were greatly encouraged by the willingness of leading ornithologists from many countries to play a part. Dr. N. Tinbergen, F.R.S., of the Department of Zoology at Oxford (who was chosen as the President of the next Congress to be held in 1970 in the Netherlands), agreed to serve as an Advisory Editor, as did Dr. K. Curry-Lindahl of the Nordiska Museet and Skansen in Stockholm, and Dr. Jean Dorst of the Muséum National d'Histoire Naturelle in Paris. Co-operation in Scandinavia and northern Europe will be ensured by Dr. Finn Salomonsen of the Zoologisk Museum, Copenhagen, who will act as Associate Editor for that region. In central Europe it is clearly of key importance to arrange effective collaboration with those responsible for the outstanding new *Handbuch der Vögel Mitteleuropas*, the first volume of which has recently been published (see *Brit. Birds*, 59: 310-312). At the Oxford meeting, Professor G. Niethammer warmly welcomed such collaboration in principle, and discussions to secure this are now in progress with Dr. U. Glutz von Blotzheim and Dr. Kurt Bauer. We should welcome further comments and suggestions from our readers. We do not underestimate the magnitude of the task ahead, but we confidently believe that with the support and help of international ornithology, already so encouragingly manifested at Oxford, *The Birds of the Western Palearctic* will be able to serve as an indispensable work of reference for the professional and amateur and will help to maintain the status of ornithology as a main growing point in many fields of biological study.

Winter food habits of Capercaillie in north-east Scotland

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(Plate 57)

BETWEEN 22nd October 1965 and 27th January 1966, I collected the crops from 99 Capercaillie *Tetrao urogallus* which had been shot by hunters in north-east Scotland. While it is generally accepted that Capercaillie feed principally on Scots pine *Pinus sylvestris* during the winter, the extent to which they do so in Scotland has not been documented in any detail. I have used the data derived from these crops, plus observations in the field, to examine more closely the winter food habits of Capercaillie in this region.

METHODS

All crops were collected either at the time of the hunt or from birds delivered to game dealers. Crops were usually placed in 4% formalin and the contents examined at a later date, but some were examined fresh. In most cases I do not know the precise location where the birds were killed, so have no way of relating the findings to the availability of foods in a given area.

Materials from the crops were identified and separated while wet. The different items were then placed in separated envelopes and oven-dried for at least 48 hours, at 80° C, according to the method used by Watson (1964). Oven-dried weight provided a means of comparing differences in the proportions of the food species found. Since small amounts of some items could be of nutritional significance if taken consistently, I also analysed the data in terms of frequency of occurrence. Numbers of pine needles were estimated on the basis of the average weight of 200 whole needles from one crop (0.006 gram per needle).

In the field, Capercaillie were seldom seen before they flew. I therefore have few observations on feeding behaviour. However, I recorded the number and sex of the birds flushed (when known); the kind of stand of trees in which they were found; whether they were flushed from the ground or a tree; if from a tree, the species (when known); and whether snow was present or absent on the ground. These data are used here to examine the habitat types frequented, as this is relevant to foods eaten.

Most of the field observations (77%) were made in conifer planta-

tions at Glen Dye, near Banchory, Kincardineshire. Forests there are mostly of Scots pine or mixed Scots pine and European larch *Larix decidua*. A few blocks of Sitka spruce *Picea sitchensis* or Norway spruce *P. abies* and Douglas fir *Pseudotsuga menziessii* are present and these latter species are occasionally found scattered amongst pine or larch plantations. These woods vary from about four years old to over 100 years, the different aged stands being mixed in a heterogeneous fashion.

The remaining observations were made in one or other of the following areas: a section of the Culbin Forest plantations (solid pine of various ages) near Forres, Morayshire; a section of the Blackhall Forest (open mature pine) near Banchory; Tom an Uird wood (mostly natural mixed pine and larch of about 45-65 years of age) near Cromdale, Morayshire; or the Black Wood of Rannoch (a remnant of the Caledonian Forest) near Kinloch Rannoch, Perthshire. Field work began in September 1965 and I have included observations from this time to February 1966 inclusive.

The 5% level of probability was used for determining significance or non-significance in all statistical analyses presented here.

RESULTS

The sex and age classes of the birds from which samples were obtained and the general areas from which they came are shown in table 1. Ages were determined on the basis of the shape of the outer primaries (Helminen 1963) and in most cases were checked by probing the bursa of Fabricius. Juveniles are birds hatched during the previous breeding season (five to eight months of age) and adults are birds over one year of age.

Table 1. Ages, sexes and general locations (counties) of kills of Capercaillie *Tetrao urogallus* from which crops were obtained

Four crops were examined from October, eight from November, 42 from December and 45 from January; all but the October ones were from birds killed on or after 15th November

Age and sex	Perth	Aberdeen and Kincardine	Inverness and Moray	Total
Adult male	14	6	6	26
Juvenile male	6	1	2	9
Adult female	21	21	11	53
Juvenile female	6	1	4	11
Total	47	29	23	99

WINTER FOOD HABITS OF CAPERCAILLIE

2. Contents of crops of 99 Capercaillie *Tetrao urogallus* from north-east Scotland

g the coniferous trees, the *Pinus sylvestris* may include some *P. contorta* (see text). The eny' columns show the number and percentage of the 99 crops in which each food species und, irrespective of whether it occurred as a trace or as a large amount; some crops contained different food species and so the figures for frequency of occurrence of individual do not add up to the total for each group, nor does the sum of the group totals equal and total. In the 'Weight' columns, t indicates a trace (less than 0.1 grams or less than 1%)

	Parts eaten	Frequency No.	%	Weight Gm.	%
CONIFEROUS TREES					
<i>Pinus sylvestris</i>	Needles, twigs, buds, cones	89	90%	809.5	90%
<i>Larix laricina</i>	Needles, twigs, buds	7	7%	23.1	3%
<i>Abies balsamea</i>	Needles	1	1%	3.8	t
<i>Picea canadensis</i>	Needles	3	3%	3.6	t
<i>Thuja occidentalis</i>	Needles	2	2%	0.1	t
Total number of crops		92	92%	840.1	93%
LEAVED TREES AND SHRUBS					
<i>Salix sp.</i>	Leaves, twigs, buds	2	2%	1.0	t
<i>Juniperus communis</i>	Leaves, twigs, buds	10	10%	3.4	t
<i>Juniperus horizontalis</i>	Leaves, twigs, buds	4	4%	1.2	t
<i>Rosa rugosa</i>	Leaves, twigs, flowers	15	15%	2.6	t
Identified shrub	Twigs, buds	1	1%	t	t
Total number of crops		17	17%	8.2	t
BROAD-LEAVED PLANTS					
<i>Urtica dioica</i>	Leaves, stems	1	1%	t	t
<i>Urtica dioica</i>	Leaves, stems	1	1%	t	t
<i>Urtica dioica</i>	Fronds	4	4%	t	t
<i>Urtica dioica</i>	Fronds	1	1%	t	t
<i>Urtica dioica</i>	Leaves	3	3%	t	t
Identified broad-leaved herb	Leaves	1	1%	t	t
Identified moss	Leaves	1	1%	t	t
Identified lichen	Thallus	1	1%	t	t
Total number of crops		10	10%	0.3	t
GRAINS					
<i>Triticum aestivum</i>	Seeds, husks	3	3%	42.3	5%
<i>Triticum aestivum</i>	Seeds	2	2%	10.0	1%
<i>Triticum aestivum</i>	Seeds (cracked)	1	1%	1.1	t
Total number of crops		5	5%	53.4	6%
Identified beetle	Entire	2	2%	t	t
Grand total of crops (four being empty)		95	96%	902.0	100%

Items and proportions found

Ninety-five of the 99 crops had some food in them. The species found, their frequency of occurrence and the total weight of each are shown in table 2.

Pine was the major species taken, representing over 90% of the material found, both by frequency of occurrence and by weight. Since lodgepole pine *Pinus contorta* has been introduced into north-east Scotland and can be confused with Scots pine, I cannot rule out the possibility that some lodgepole pine was in these crops. In only one case, however, did I find pine needles that seemed to differ in colour from those normally found and I therefore believe that most of the pine was *P. sylvestris*. No other conifer appeared to have much importance. However, larch had lost most of its needles by 15th November, the date after which the great majority of the crops were collected.

Broad-leaved trees and shrubs appeared to be negligible so far as the amounts eaten were concerned, but both blaeberry *Vaccinium myrtillus* and heather *Calluna vulgaris* seemed more important when expressed in terms of frequency of occurrence. Even so, they were always found in small amounts, blaeberry never exceeding 1.9 grams in a single crop and heather 1.0 gram. Leaves of birch *Betula sp.* were found in only one crop, from October.

Herbaceous plants were insignificant, in both weight and occurrence. They appeared to be taken, in most cases, merely as titbits when the birds were on the ground, and more commonly in October than during the winter.

No cereal grains were found in crops taken after 15th November and all the oats *Avena sativa* were in October. The maize *Zea sp.* all came from one crop and was a cracked preparation; it was probably picked up where domestic animals were being fed.

Insects were found in only two crops, both collected in October. One beetle (Coleoptera) was involved in each case. It is possible that these were picked up accidentally along with other food.

Items other than pine occurred sporadically in all sex and age classes. Since none occurred consistently and they were usually in small amounts, there is no suggestion that they were of more importance to one sex or age class than to another. Pine was the major item found for all groups.

Gizzards were not normally available for analysis, but I was able to examine the gizzard contents of an adult male killed on 26th January in the Deeside area. It contained 5.4 grams of vegetation (oven-dried), which I did not attempt to identify, and 795 small stones (mainly quartz) which weighed 20.4 grams. These figures fall within the ranges presented for these items for Capercaillie in the U.S.S.R. (Semenov-Tian-Shanskii 1960). Judging from the rounded appear-

ance of the stones, they had been in the gizzard for some time. In the 99 crops analysed, only two stones were found, one in each of two different crops.

Assessment of pine in the diet

Since pine obviously forms a most important item in the winter diet, I have made a more detailed analysis of this species as found in the crops. Needles, twigs, buds and cones of pine are all eaten. They may be taken in different ways: (1) twigs with needles and/or buds, (2) twigs with cones, (3) bare twigs, (4) individual buds, (5) individual cones or parts of cones, or (6) pairs of needles, individual needles or parts of needles.

Many pieces of twigs with buds and needles attached are taken by Capercaillie. The largest number of these pieces found in one crop was 171 (plate 57a), from an adult female killed on 15th November. Harvie-Brown 1879 recorded a crop in which 214 such items were reported). In another crop 108 such shoots weighed 12.41 grams or 0.12 gram each. The different parts associated with these 108 shoots were as follows:

	Number	Total weight	Mean weight	Percentage
Twigs	108	2.3 grams	0.02 grams	18%
Buds	80	1.1 grams	0.01 grams	8%
Needles	c. 1,500	9.0 grams	—	74%

Seventy-five loose buds from this crop weighed 1.5 grams or 0.02 gram per bud, thus suggesting that buds taken individually tend to be larger than those attached to shoots. In this crop there were also 15.7 grams of loose needles (c. 2,600 needles), six small pieces of bare twig, and fragments of one cone. The total contents of this crop weighed 9.7 grams and can be seen in plate 57b.

In the overall analysis of pine, I counted the number of twigs, buds and individually identifiable cones and estimated the number of needles. These items were weighed separately and a summary of these data is presented in table 3. Needles occurred in all crops containing pine and accounted for over 92%, by weight, of the parts of pine found. Twigs and buds each occurred in about 66% of the crops, but accounted for only a small amount of the pine eaten. Cones were relatively unimportant, both in terms of frequency and weight.

Even though twigs occurred in small quantities, they may have special importance because of their frequency. Of the 1,349 twigs found, 1,174 had needles, buds or cones attached and thus may have been taken primarily as an adjunct to the collection of these other items.

Table 3. Frequency of occurrence and weights of different parts of pine *Pinus spp.* from crops of 89 Capercaillie *Tetrao urogallus* from north-east Scotland
The 'Frequency' columns show the number and percentage of the 89 crops in which each food species was found (see explanatory heading to table 2)

Parts	Number of items	Frequency		Weight	
		No.	%	Gm.	%
Needles	c.125,000	89	100%	749.0	92%
Twigs	1,349	59	66%	36.6	5%
Buds	1,004	59	66%	15.8	2%
Cones	c.69	18	20%	8.1	1%
Total number of crops		89	100%	809.5	100%

However, 174 pieces of bare twig were apparently taken as items of food in themselves.

Buds also occurred frequently, but again made up only a small proportion of the total pine eaten. Of the 1,004 buds found, 761 were on twigs, mostly with needles also attached. Thus, as in the case of twigs, buds were taken mainly along with other items. Only 243 of the buds were loose in the crops and presumably taken as individual items.

Whereas all buds together averaged 0.02 gram each, four large buds averaging 0.94 grams were found in one crop. These were most likely terminal buds and stood out from all the rest in size.

Cones were all small and unopened, mainly about one centimetre long, and relatively uniform in size. They were usually whole and a sample of ten weighed 1.4 grams, or 0.14 gram each.

Size of crop contents

The largest amount of food in any one crop was 71.9 grams, from an adult male killed in Perthshire about 13th January. The largest amount of food found in a female was 56.2 grams from a hen killed in Perthshire on 15th November.

The mean weight of crop contents was 9.11 grams per bird and the frequency distribution by weight classes was as follows (adults and juveniles combined):

	Males Females			Males Females	
Empty	1	3	30.01-40.0 grams	0	2
0.001-1.0 grams	10	20	40.01-50.0 grams	0	0
1.01-10.0 grams	6	26	50.01-60.0 grams	0	1
10.01-20.0 grams	8	6	60.01-70.0 grams	1	0
20.01-30.0 grams	8	4	70.01-80.0 grams	1	0

WINTER FOOD HABITS OF CAPERCAILLIE

Most crops thus contained relatively little in relation to their apparent capacity. This is presumably because they were from birds taken at various times of the day and not at or following peak feeding activity. There was some tendency for males to have more food than females, but the samples are too few to say this with certainty.

Observations in the field

Field observations on the flushing location of birds between September and February show that the Capercaillie becomes largely arboreal as winter arrives (fig. 1). There is no statistically significant difference in the proportion of birds flushed from trees or the ground between September, October and November or between December, January and February, but there is a difference between the first three months

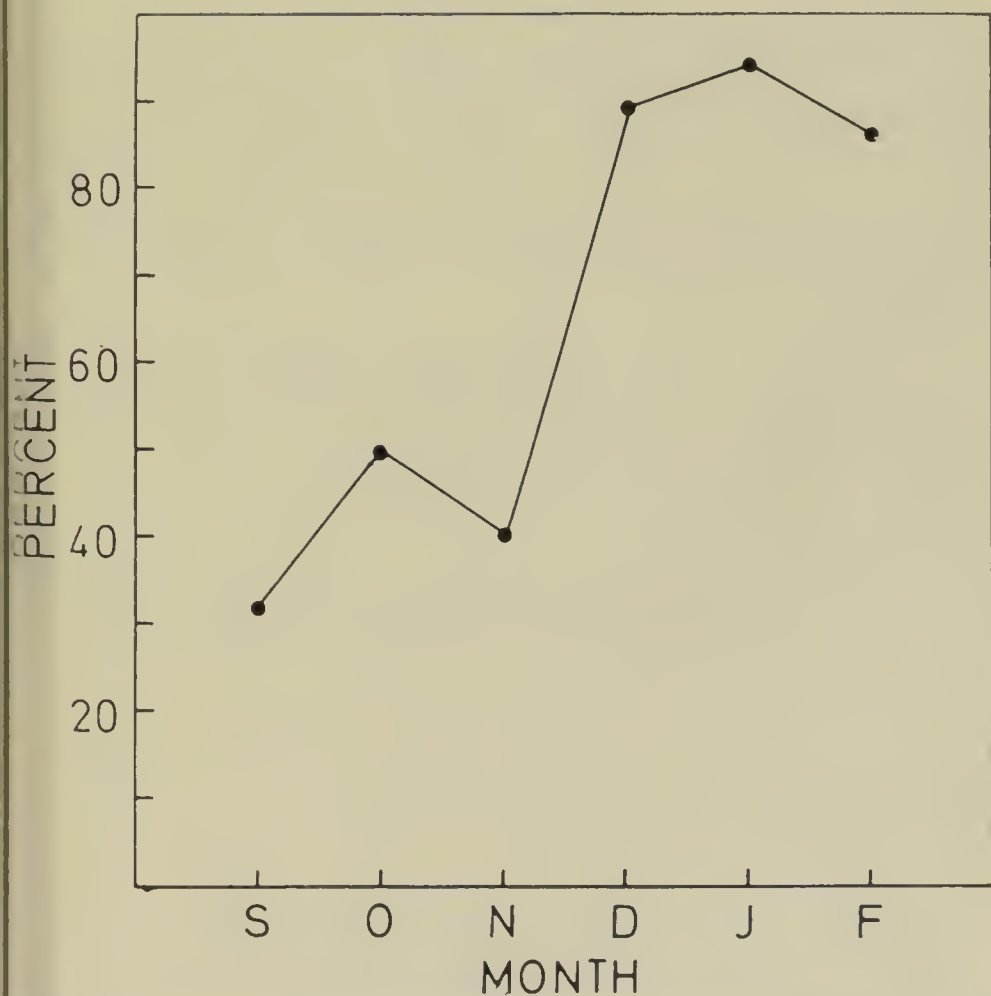


FIG. 1. Percentages of Capercaillie *Tetrao urogallus* flushed from trees between September 1965 and February 1966

under-story species to be relatively unimportant in the diet at this time of year.

DISCUSSION

The data presented here represent only one year and must, therefore, not be considered definitive, especially since Boag (1963) has shown that the autumn foods of Blue Grouse *Dendragapus obscurus* may vary significantly from year to year. However, I feel that certain conclusions and some speculations can be made.

There can be little doubt that needles, twigs and buds of conifers, especially Scots pine, form the major winter food of Capercaillie in this region. It would take a tremendous shift in diet from year to year, or error in technique, to alter this conclusion. This agrees with records of winter foods of the Capercaillie on the European Continent (see Seiskari 1962 for a good review) and with earlier reports from more general data on the food habits of Scottish birds (Harvie-Brown 1879, Pennie 1950, Bannerman and Lodge 1963). Other items are taken sporadically throughout the winter, but appear insignificant, at least in terms of amounts taken.

Pine needles obviously form the bulk of the food eaten. Both twigs and buds are taken mainly along with needles and neither in any great quantity. They may be of more importance than suggested here, however, because they are both taken frequently, even though in small amounts.

Almost no grit was found in crops. This seems of special interest since there were several periods during this winter when the ground was snow-free and when the birds could easily have collected grit had it been required or desired.

Clearly, the total weight of foods found here represents only a small amount of the daily intake of Capercaillie in the winter. If the mean weight of crop contents are considered in relation to the maxima recorded here for males and females, one full crop per day would be approximately seven to eight times the mean weight recorded. If birds fill their crops twice each day, or if the maxima presented here are significantly low, the daily food consumption would be even greater.

The maximum weights of crop contents found for the two sexes probably do not represent the maximum capacities attainable, for Semenov-Tian-Shanskii (1960) reported a crop capacity of 46 grams per kilogram of body weight for Capercaillie in the U.S.S.R. Mean body weights of 27 adult males in my sample were 3.9 kilograms and of 59 adult females 1.8 kilograms. Semenov-Tian-Shanskii's figure suggests that the full crop of an adult male should contain about 180 grams and that of an adult female about 83 grams, much more than the maxima found here.

Clearly, there is a marked dependence on pine in winter, even though other plants may be readily available. Thus, the heavy use of pine is not dictated by this being the only species available because of snow-cover. The shift at this time to forests containing pine and the change to arboreal living, mainly in pine trees, also agrees with these data. Such a shift has also been recorded in Finland by Koskimies (1957) and Seiskari (1962).

ACKNOWLEDGEMENTS

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SUMMARY

Crop contents from 99 Capercaillie *Tetrao urogallus* shot by hunters in north-east Scotland during the winter of 1965-66 were analysed. These showed Scots pine *Pinus sylvestris* to represent over 90% of the winter food. Needles made up the bulk of the pine taken, although twigs, buds and unopened cones were also eaten. Small amounts of other coniferous trees, broad-leaved plants and ferns were also used, but showed little increase in the diet during snow-free periods. Cereal grains were not found in crops taken after 15th November. Little grit was found in crops even though much of the winter was snow-free. The mean weight of crop contents suggests that the amount of foods recorded here represents only a small proportion of the total daily intake.

Observations in the field showed Capercaillie to make a distinct shift from ground to tree-dwelling, and from forests with little or no pine to those with pine, about mid-November. These changes coincided with the arrival of the first snow and agree with the data from the analysis of crop contents.

Male Capercaillie were found most often in solid stands of pine and females in stands of mixed pine and European larch *Larix decidua*. The food habits of the two sexes did not vary, however. A few observations along trails of Capercaillie in the snow support the data from the analysis of crops in that birds seemed to spend little time on the ground and thus could add little from low-growing plants to their total winter diet.

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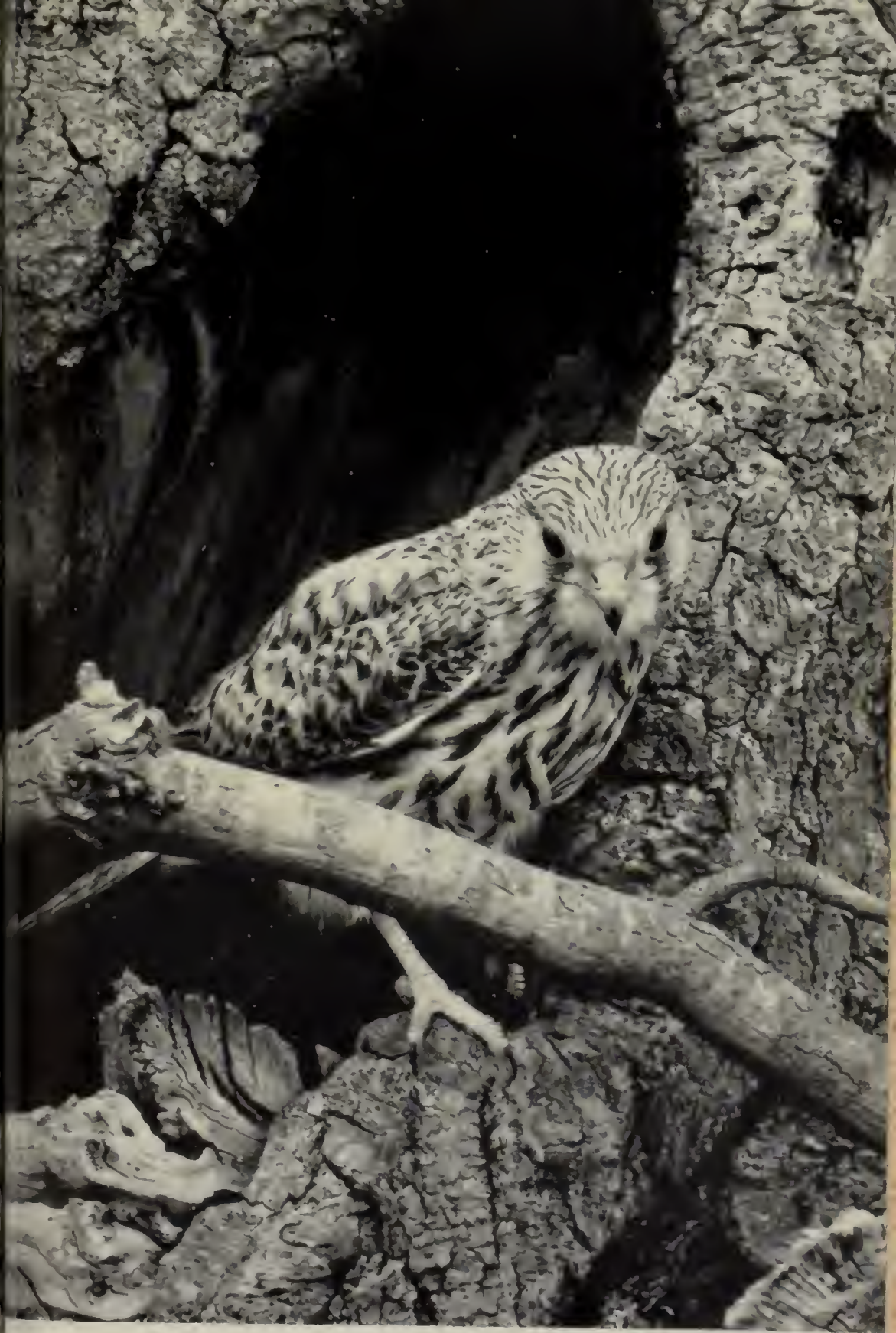
British bird-photographers

7. T. M. Fowler

(Plates 50-56)

TOM FOWLER is one of the fathers of modern bird-photography. Born at Barnsley, Yorkshire, in 1883, he produced his first bird portraits in the early 1900's and was still photographing until a few years ago when his eyesight began to fail. Only last year he resigned from the Zoological Photographic Club after being a member for more than half a century and its President in 1938. He was awarded the Royal Photographic Society's Medal as long ago as 1923 and later that same year was elected a Fellow. He was President of the Barnsley Photographic Society for more than two decades, and for many years was in great demand as a lecturer and as a judge at exhibitions.

Before his retirement just after the war, Tom Fowler was Chief Engineer at a large Yorkshire colliery. Bird-photography became his favourite hobby because it took him away from the drab areas of the coal mines, but his skill as an engineer enabled him to devise many photographic gadgets. Not the least of these was a stereoscopic camera which he had specially built with paired six-inch Ross Homocentric lenses and a Newman & Guardia silent shutter. During the 1920's and 1930's several bird-photographers became enthusiastic about stereoscopic work, but none, I think, reached Tom Fowler's high standard.



LATE 50. Female Kestrel *Falco tinnunculus* at nest, Suffolk, 1948 (T. M. Fowler)
(pages 336-338)



PLATE 51. Above, Herring Gull *Larus argentatus* upon nest, Isles of Scilly, 1913.
Below, Nightjar *Caprimulgus europaeus* brooding eggs, Yorkshire, 1917 (T. M. Fowler)





PLATE 52. Above, Jay *Garrulus glandarius* with well-grown brood, Yorkshire, 1916.
Below, Gannet *Sula bassana* and dark-plumaged young, Bass Rock, 1923 (T. M. Fowler)





PLATE 53. Whimbrel *Numenius phaeopus* close to nest, Shetland, 1933 (T. M. Fowler)



PLATE 54. Above, male Lapwing *Vanellus vanellus* brooding eggs, Yorkshire, 1931.
Below, Corn Bunting *Emberiza calandra* carrying food, Yorkshire, 1937 (T. M. Fowler)





PLATE 55. Above, Little Owl *Athene noctua* at nest with beetle, Yorkshire, 1939.
Below, Short-eared Owl *Asio flammeus* and young, Northumberland, 1941 (T. M. Fowler)



PLATE 56. Corncrake *Crex crex* creeping on to eggs, South Uist, 1926 (T. M. Fowler)





PLATE 57. Scots pine *Pinus sylvestris* from the crops of two adult female Capercaillie *Tetrao urogallus*. Above, 171 shoots; below, 108 shoots, 75 loose buds, parts of one cone, six pieces of bare twig and about 2,600 needles. Some shoots had parts of the needles eaten before the shoot was taken (pages 325-336)



Since he lived in the same county as another well-known bird photographer, the late Ralph Chislett, who was also his exact contemporary, it is not surprising that the two should have become firm friends and made many trips together, both locally and to such places as Orkney where they photographed the Hen Harrier *Circus cyaneus* in 1934. After his retirement, Tom Fowler went to live in Suffolk and it was not long before he was photographing the birds in his new surroundings. Stone Curlews *Burhinus oedicnemus* and Barn Owls *Tyto alba* seem to have become his favourites and he photographed several pairs in the years following the war.

In the National Collection of Nature Photographs established by the Nature Conservancy there is a historical section in which photographs taken more than 25 years ago are kept. The fact that several of the present selection of Tom Fowler's photographs are twice as old as that and yet compare favourably with any today, despite all the aids of modern equipment, is a tribute to his skill. Look, for instance, at his Herring Gull *Larus argentatus* (plate 51a) and his Nightjar *Caprimulgus europaeus* (plate 51b) taken 53 and 49 years ago respectively. In the case of the latter it would be difficult to improve even now on the subtle range of tones in the cryptic coloration. His Jay *Garrulus glandarius* (plate 52a) has also stood the test of half a century; tree-top photography such as this particularly fascinated him, perhaps because his engineering skill was brought into play in the construction of some of the first pylon hides. Heights never worried him and in 1922 he photographed the Gannets *Sula bassana* on the Bass Rock (plate 52b), hauling his heavy and cumbersome half-plate camera and tripod into precarious positions to do so.

Although he never ventured abroad to photograph birds, he travelled widely through Britain. In 1926 he went to South Uist in the Outer Hebrides and among his many successes there was the Corncrake *Crex crex* (plate 56), a bird which at that time had rarely been photographed. In 1933 he and Harold R. Lowes, who was one of his keenest pupils and who was featured in this series in 1964 (*Brit. Birds*, 7: 325-326 and plates 46-53), visited Shetland and photographed the nests of three pairs of Whimbrels *Numenius phaeopus* (plate 53); their results are still looked upon as some of the best ever taken of this rare British breeding wader. A much commoner wader which has frequently been photographed is the Lapwing *Vanellus vanellus* (plate 54a), but it is not often that a successful shot is obtained of the comparatively timid male at the nest; even the careful erection of a hide can cause him to leave all the incubation to his mate. Corn Buntings *Emberiza calandra* often follow a particular route to the nest and this made possible the picture of an adult on a broken stem (plate 54b). Flash photography fascinated Tom Fowler and he thought nothing

of spending night after night in a hide photographing owls, Nightjars and Badgers *Meles meles*. The Little Owl *Athene noctua* perched near its nesting hole (plate 55a) is just one of his many results in this field. Great skill is required in 'gardening' to clear away vegetation which will detract from a photograph, but this can easily be overdone and, quite apart from exposing the nest to greater danger from predators, can give a wrong impression of the natural habitat. So many photographers would have opened up the nest of the Short-eared Owl *Asio flammeus* (plate 55b) to get a clear view of the young, but here only the foreground grass has been pressed down. This care in 'gardening' is again shown in the photograph of the Kestrel *Falco tinnunculus* (plate 50): most people would have removed the horizontal branch, but Tom Fowler made it a part of the picture. ERIC HOSKING

Analyses of Barn Owl pellets from an Irish roost

By J. S. Fairley

FROM THE VARIOUS analyses of pellets referred to in this paper, it is known that the Barn Owl *Tyto alba* in Great Britain preys upon no fewer than eleven species of small rodents and insectivores, at least six of which it takes commonly; it also eats small birds. In Ireland only four of these small mammals are widespread, namely the Wood Mouse *Apodemus sylvaticus*, House Mouse *Mus musculus*, Brown Rat *Rattus norvegicus* and Pygmy Shrew *Sorex minutus*, although the Bank Vole *Clethrionomys glareolus* has recently been found in a small area of the south-west (Claassens and O'Gorman 1965). Since the food of the Barn Owl must therefore differ considerably between the two islands, the following results of analyses of pellets from a roost near Strangford, Co. Down, are of interest.

The pellets were collected beneath four lime trees, each of which had extensive 'witches' brooms' in their branches. The trees stood in parkland with woodland and sea-shore close at hand. The 'witches' brooms provided excellent cover and at least two Barn Owls roosted in them during the day. As a few pellets have also been picked up from beneath trees similarly infected in two other widely separated localities in Ireland, it would appear that this type of roost is by no means rare although, as far as can be determined, it has so far gone unrecorded. Visits were made for collection at least once every month from February 1964 to February 1965. The trees appeared to be

deserted from May to August and again from late December to late January. It is possible that there were other roosts in the vicinity as there were extensive, mostly disused, farm buildings only a few hundred yards away. Because of this periodic absense, possible seasonal variations in prey taken are not given in the discussion of results and also because pellets may have been in the witches' broom for some time before being dislodged. Indeed on some occasions a few were picked up in an advanced state of decomposition although the roost had been cleared only a few weeks previously.

The pellets were dried on a hot-plate and then broken up for analysis. The numbers of mice and rats were estimated from the maximum number of left or right dentaries (lower jaw bones) present in a batch of pellets. Initial counts of the numbers of rodent crania in pellets of both the Barn Owl and the Long-eared Owl *Asio otus* showed that these never exceed the numbers of right and left dentaries, probably because of their tendency to fragment and lose teeth. However, counts of both crania and jaws of the Pygmy Shrew were made as the latter are minute and could be missed.

The results of the analyses are shown in table 1. Besides the animals listed there were a few insect remains. As the prey species are by no means all of the same weight, use was made of 'conversion factors' to create a more realistic picture of the percentage of total prey each species represents. This method of correcting difference in size, taking a 20-gram rodent as standard, was suggested by Southern (1954) for the

Table 1. Contents of pellets collected at a roost of Barn Owls *Tyto alba* at Strangford, Co. Down, Northern Ireland, from February 1964 to February 1965. The 'conversion factor' takes a 20-gram rodent as standard and thus corrects for differences in size (see text)

	Wood Mouse	House Mouse	Brown Rat	Pygmy Shrew	Birds
February 1964	145	31	12	27	1
March 1964	65	15	4	23	
April 1964	20	6		2	
May 1964	8	1	1		
August 1964	33	22	4	43	1
September 1964	15	2		10	
October 1964	18	5	1	11	
November 1964	5	1	3	3	
December 1964	4	3	4		
February 1965	53	19	13	16	
Totals	366	105	42	135	2
Conversion factor	$\times 1$	$\times 1$	$\times 5$	$\times 0.2$	$\times 1$
Prey units	366	105	210	27	2
Prey units	51%	15%	30%	4%	—

Tawny Owl *Strix aluco* and has since been followed by Beven (1961) and Teagle (1963) for the Barn Owl.

It is clear from the results that the diet of the owls which produced these pellets consisted of Wood Mice and Brown Rats with smaller quantities of House Mice and Pygmy Shrews.

Ticehurst (1935) in England suggested that the prey of this bird, which appeared to vary from locality to locality, probably reflects the relative abundance of prey, the absence of an animal indicating its scarcity. Hanney (1962), however, working in Nyasaland, where many small mammal species are available, showed that the numbers of *minor* prey species eaten are not necessarily associated with their relative abundance. In the present study all the mammals taken were common in the vicinity as were small birds.

A detailed comparison with results available from Great Britain is hardly justified here. It is interesting to note, however, that, while the proportions of the prey species which occur both there and in Ireland are very similar in each of the two largest analyses made in England (Collinge 1924, Ticehurst 1935), they differ considerably from those of the present results, the English analyses showing many less Wood Mice, House Mice and Pygmy Shrews and more Brown Rats and birds.

ACKNOWLEDGEMENTS

I should like to thank David and Anthea Gotto who discovered the roost and Professor R. A. R. Gresson and Professor G. Owen for facilities provided in the Department of Zoology at the Queen's University of Belfast.

SUMMARY

Pellets were collected from a roost of at least two Barn Owls *Tyto alba* in Co. Down, Northern Ireland, and analysed for prey content. The owls lived mainly on Wood Mice *Apodemus sylvaticus* (51% by estimated weight) and Brown Rats *Rattus norvegicus* (30%) with smaller quantities of House Mice *mus musculus* (15%) and Pygmy Shrews (4%). Birds were rarely taken.

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Notes

Goosander eating bread, attacking Coots and up-ending.—From January to March 1966, at Fetcham Mill Ponds, Surrey, I regularly saw a wild female Goosander *Mergus merganser* feed on bread thrown into the water. She used to join the many Coots *Fulica atra* in the scramble for food and she would deal with any of these that got in the way by clamping her bill on the backs of their necks and trying to push them under the surface. She would approach to within eight feet of me when coming for bread and I also watched her up-ending in a similar manner to that recently described by D. Warden (*Brit. Birds*, 19: 192).

S. GREENWOOD

Common Tern diving from bridge.—About mid-day on 8th July 1965 my wife and I watched a Common Tern *Sterna hirundo* repeatedly diving for food from the Muckle Roe bridge in Shetland. The tern perched on the top rail of the bridge, facing outwards, and watched intently, turning its head from side to side and occasionally stretching its neck forward and downward so that its bill was below the level of its legs. It left this perch either to dive in typical tern fashion straight into the sea about 15 feet beneath or, after a few wing-beats, to hover momentarily before plunging. At times the tern simply appeared to lean forward and fall off into the dive without beating its wings at all. We watched for about 30 minutes, during which time the bird made some 15 dives from the bridge, several of which were seen to be successful. After each dive the tern flew on a short distance and then returned quickly to its perch. There was a strong tide running under the bridge. Several other terns were diving in the vicinity, but only the one was seen to feed in this unusual and highly successful manner.

ESTLIN WATERS

Blackbird nesting in unlined hollow.—On 31st May 1964, in Renishaw Park, Derbyshire, I found the three eggs and newly-hatched chick of a Blackbird *Turdus merula* in an old ruined house. These were in a tight hollow in an accumulation of soil and dust on a shelf three feet high above the cellar and there was no sign of any nesting material whatsoever. The area is rarely visited by children and there is little chance that human intervention was the cause. I did not see the adult birds in the short time I was there, nor was I able to visit the 'nest' again to see if it was successful.

R. A. FROST

Blackbird eating fallen flowers of wild cherry.—On 23rd April 1966, in my garden at Brentry, Bristol, I watched a male Blackbird *Turdus merula* eating some of the many flowers of a garden or wild cherry

Prunus avium which were lying on the lawn after a period of strong winds and rain. The bird swallowed three whole flowers and five or six separate petals, after which it resumed searching for earthworms.

A. P. RADFORD

Unusual song of Willow Warbler.—The following may be of interest with reference to the recent note by A. S. Cheke and H. A. Ford (*Brit. Birds*, 59: 155). On 7th May 1966, in woodland at Scarcliffe, Derbyshire, I heard an unfamiliar song. Investigation showed this to be a Willow Warbler *Phylloscopus trochilus*, which I watched for several minutes whilst it regularly gave the same song. The first three notes were almost normal, but slightly lower-pitched and faster. This was followed immediately by eight or nine hard, stuttering notes, *tit tit tit tit*. . . . The whole effect was rather reminiscent of the song of a Blue Tit *Parus caeruleus* and, as at least one of the latter was singing near-by, this may well have been an attempt at mimicry.

R. A. FROST

House Sparrow robbing Wren of food.—On 8th May 1966, in my garden at Hilpertton Marsh, Wiltshire, I was watching a Wren *Troglodytes troglodytes* which had a nest under some ivy in a stone wall. It perched in a willow carrying a beakful of food and then flew towards the nest, but just before it reached cover a male House Sparrow *Passer domesticus* chased it and forced it to the ground in some long grass. After a second or two, the House Sparrow flew up to the top of the wall where it proceeded to swallow the food previously carried by the Wren; the latter meanwhile flew into a bush with its beak empty. The attack by the House Sparrow was quite deliberate and I had seen a similar chase without actual pilfering a few days previously.

GEOFFREY BOYLE

Reviews

A Bird Overhead. By Clive Simson. Witherby, London, 1966. xvi+174 pages; coloured frontispiece, 8 monochrome illustrations, 17 text drawings, 2 maps; bibliography and index. 30s. A tenuous and faintly-coloured thread, writes Colonel Simson in his introduction, runs through his book. In fact, there seem to be two: the author's consuming interest in the nest as the high point of the bird's annual cycle, and his power to enjoy to the full his days in the field.

Three chapters and part of a fourth out of a total of 16 have been published previously in magazines, and others seem to have been written some years ago; how otherwise would such a keen birdster be unaware of the recent breeding of the Wood Sandpiper in the Highlands? The chapters vary a good deal in their meat content, though none are without original observations. A good deal of what might be called persiflage has been injected, presumably to broaden the appeal. The study of the comparative breeding density of Ravens in two dissimilar habitats (the coastal area of Schleswig-Holstein in 1946-47 and a North Wales valley in 1949-53) and the chapters on nest-finding techniques for Hobby, Woodlark, Tree Pipit, Greenshank and Short-eared Owl are the most interesting to serious ornithologists.

Colonel Simson quotes several famous authorities, especially Edgar Chance and Norman Gilroy, who evolved a method for finding the nests of Greenshanks which the author has perfected and which should be read in full by aficionados. He has had access to Gilroy's original diaries and the account of how the master was taken in by 'one of the most intolerable rogues living', when he went to Shropshire for Hobbies in 1904, is a splendid period piece.

The author has plainly been an oologist himself, but does not enter into a violent defence of the fraternity, which is as well, because the good field work he has done does not depend to any extent on taking eggs. He took one from each Raven's nest to compare them and trace the identity of the females and, in a chapter on the Cuckoo, makes a rather vague claim that it is necessary to take clutches of African species (not further defined) because the eggs of their parasites can only be differentiated on shell weight—also true, he says, for the European Cuckoo outside Britain. More evidence and more discussion of this would have been desirable.

The illustrations by R. B. Talbot-Kelly are frankly disappointing; the wash drawings often miss the essential jizz, notably of the Hoopoe, while the underwing of the coloured Bee-eater bears scant relation to reality, though I admit the artist would have found little to help him on this in most British bird-books.

BRUCE CAMPBELL

The Living Air: The Memoirs of an Ornithologist. By Jean Delacour. Country Life, London, 1966. 173 pages; 34 photographic plates. 45s.

Jean Delacour's autobiography, written in his inimitable style—direct in English and not, as might be expected, translated from an original French—is an absorbing history of ornithology and ornithologists during the last sixty years. Jean Delacour is one of the few remaining ornithologists who are also great all-round naturalists and his know-

ledge of trees, plants, mammals and many other forms of wildlife is surpassed only by his encyclopaedic knowledge of birds. In his youth ornithology was mainly the pastime of the leisured rich and was regarded more as a hobby of the eccentric and the not so young. As he himself states, "Throughout my early years people were always surprised to find a young man whenever I came into contact with them. Evidently a naturalist is perforce an elderly odd-looking gentleman in popular imagination."

Jean Delacour is a born naturalist and his interest in birds started at the age of three; even while still a schoolboy he built up a magnificent collection of birds and plants at his home in Picardy. He studied both biology and economics at the Universities of Paris and Lille, but being in the fortunate position that he could spend his life as he wished he was able to follow his bent for natural history—vertebrate zoology, aviculture and nature protection being his chief interests. He travelled in many parts of the world collecting both museum specimens and live birds and his descriptions of his expeditions, charmingly told, are far from being the somewhat dreary catalogue of species and events which sometimes mars such accounts. With his great powers of observation and discernment, his sense of humour and his understanding of human beings, he is able to paint a word picture so vivid of the countries he visited that he carries the reader along with him to many remote places of the globe.

Much of the book describes countrysides, customs and a mode of life which will never be seen again and in this alone it is a valuable record. Jean Delacour has lived through a time of tremendous transition, but his determination not to be broken by disasters and his unshakable philosophy have made it possible for him to continue to take a leading part in ornithology despite many dramatic changes in his eventful life. The illustrations are well-chosen and add much to the interest and attractiveness of the book.

PHYLLIS BARCLAY-SMITH

Letters

Is the flight-sound of the Mute Swan vocal?

Sirs,—The flight-sound of the Mute Swan *Cygnus olor* must ultimately derive from its wing-beats because it is produced in time with them and is heard only in flapping flight; when the bird glides down to water the

sound ceases. This does not mean that the wings themselves produce the sound. To do so, they would have to have a peculiar structure, but that is not the case; the wings are like those of the Whooper Swan *C. cygnus*, which has a loud, trumpeting call independent of its wing-beats. I suggest that the Mute Swan's sound is vocal. If one looks carefully at a Mute Swan in flight at close range, one sees that the lower end of its neck (where the syrinx is) pulsates rhythmically in time with the wing-beats. This suggests that the alar musculature somehow acts on the syrinx. If the sound is made by the wings alone, why does the neck pulsate? Does the neck pulsate in any other species of swan in flight? If so, does that species call in flight or is it 'mute', and is its trachea simple (as in the Mute Swan) or complex (as in the Whooper Swan)?

C. SUFFERN

[We showed this letter to Dr. Janet Kear of the Wildfowl Trust and, after discussing it with her colleagues, she commented as follows: 'We all assume that the sound made in flight derives directly from the wing-beats, but there seems to have been no investigation of the subject. Probably it serves to keep the flock together, much as does the constant vocal singing of the northern swans *C. cygnus* and *C. columbianus*. It is interesting that the wings of the Black Swan *C. atratus* are reported to make a comparable sound in flight and Jean Delacour (1954, *The Waterfowl of the World*, vol. 1, p. 69) states that the Black-necked Swan *C. melanocoryphus* likewise produces "a loud rustling sound" with its short wings. Both these swans and the Mute have similarly constructed trachea and are probably never as vocal in flight as are the Whooper and Bewick's. However, a number of us have heard Mute Swans make obviously vocal sounds while flying, without apparently interrupting the wing-throb; we therefore think that Dr. Suffern must be incorrect, but we cannot give chapter and verse.

'It might be added that the wings of the Mute Swan are not exactly like those of the Whooper Swan although the wing formula and margination are similar. The Mute Swan's wing feathers are shorter and fold less rigidly against the tail. A gap between the wing tip and the tail enables Mute, Black and Black-necked Swans to carry their young, whereas a Whooper or Bewick's cygnet would have difficulty climbing on to its parent's smooth back.'—Eds.]

Purple Sandpipers feeding above the littoral zone

rs,—In his interesting paper on the winter feeding of the Purple Sandpiper *Calidris maritima* (*Brit. Birds*, 59: 165-179), C. J. Feare referred to the statement in *The Handbook* that this species is strictly coastal outside the breeding season. He added that the diet consists entirely of organisms found within the littoral zone'. While this was

so in the areas studied in Yorkshire, Purple Sandpipers do occur away from the shore on several islands where they are sometimes associated with colonies of Grey Seals *Halichoerus grypus*.

Purple Sandpipers are a regular autumn migrant in numbers of up to two hundred at North Rona (Outer Hebrides) and a few frequently join the larger parties of Turnstones *Arenaria interpres* that feed among the Grey Seals on Fianuis. This rocky peninsular is about a quarter of a mile across and is covered with tracts of *Stellaria* sward interspersed with muddy pools much churned up by wallowing seals. On several occasions in October 1962, while with a Nature Conservancy expedition, I observed Purple Sandpipers feeding with Turnstones among the seals right in the middle of this area and well above the high water mark. Dr. F. Fraser Darling (1939, *A Naturalist on Rona*) also noticed Purple Sandpipers on these seal grounds and recorded that they joined the Turnstones in the winter-time in working over the morass which the seals had made. I have observed the association of Purple Sandpipers and Grey Seals in winter on St. Kilda (*Scot. Birds*, 2: 231) where these species occur together on rocks only just above the high water mark. On Foula (Shetland) Purple Sandpipers have sometimes been recorded feeding inland around the crofts (*Scot. Birds*, 4, supplement: 37).

These observations indicate that the Purple Sandpiper is not entirely a 'littoral organism', but, at least in some areas, does also feed above the littoral zone. Here its feeding activities need not have the tidal rhythm observed in the strictly coastal individuals studied by C. J. Feare.

ESTLIN WATERS

Sirs,—I am grateful to you for allowing me to comment on the preceding letter from Dr. Estlin Waters on Purple Sandpipers *Calidris maritima* feeding above the littoral zone in the Outer Hebrides, including St. Kilda, and Shetland. Peter Davis (*in litt.*) has reported to me similar behaviour on Fair Isle (Shetland), where he found Purple Sandpipers feeding in the turf along the cliff tops in very rough weather. (Peter Davis also encountered Purple Sandpipers relatively scarcely on their feeding grounds at night, but could not say that they were feeding; I find it difficult to understand how a bird feeding in the manner described in my paper in *Brit. Birds*, 59: 165-179 could do so without seeing what it was eating.)

Dr. John Gibb (*Ibis*, 98: 506-530) reported Purple Sandpipers feeding on the larvae of kelp flies *Coelopa* spp. at Porthcaw, Cornwall, and owing to the great differences between the faunas of rocky shores in different situations I think that one would expect the food spectrum of these birds to vary from locality to locality. The diet described in my paper for two flocks in Yorkshire should certainly not be taken to

be wholly representative of all Purple Sandpipers wintering in the British Isles.

The fact that Purple Sandpipers feed away from the littoral zone in the Scottish islands is interesting with regard to the winter distribution of the species. Prof. Dr. K. H. Voous (1960, *Atlas of European Birds*) stated that Purple Sandpipers are sedentary where coasts remain ice-free and accessible, as on the Murmansk coast of the Arctic Ocean and in the Aleutian Islands, but are migratory elsewhere. This suggests that the main reason for their migrating is that the freezing of coasts renders feeding grounds inaccessible at other breeding areas. It is obviously essential that birds should move away from such areas in winter, but three other factors are important in this context.

Firstly, as Dr. Finn Salomonsen has pointed out (*Dansk Biol. Medd.*, 1952, no. 6: 40), members of the genus *Calidris* are frequently ephemeral in their breeding quarters, staying perhaps only two months; they thus vacate their breeding sites well in advance of the returning ice, and this may be related to the brevity of the season during which food is plentiful in northern latitudes. Secondly, the length of the daylight period in winter decreases considerably towards the north. Thirdly, the extent of the intertidal zone is smaller on northern shores (*Admiralty Tide Tables*, 1966, vol. 1).

I think that it can be accepted that out of the breeding season Purple Sandpipers are mainly coastal (see *The Handbook*, vol. 4: 271-276), not necessarily implying that they are restricted to the littoral zone. The time allowed for feeding in the littoral zone, which in my study area in Robin Hood's Bay, Yorkshire, is undoubtedly the favoured feeding area, is dependent upon the hours of daylight, the state of the tide and the weather (*Brit. Birds*, 59: 176). In higher latitudes, with shorter daylight periods, the high tide periods will take a larger proportion of the daylight. Assuming that Purple Sandpipers do not feed at night, they must move to other, perhaps less favoured, feeding grounds in order to get enough food. One might therefore expect a cline in the behaviour of Purple Sandpipers, with those wintering in lower latitudes spending all of their feeding time in the littoral zone and resting when the tide is in, but with the time spent feeding away from the littoral zone increasing with increasing latitude.

The observations from Robin Hood's Bay and the Scottish islands support this hypothesis, but a great deal more information is required from other latitudes within the Purple Sandpiper's winter range. In northern Norway this species winters up to latitude 70° N, i.e. within the Arctic Circle. It would be particularly interesting to have observations on their feeding routine there and in the Murmansk region. The morphology of the bill does not appear to preclude this species from probing for food in mud and sand, when the reception of stimuli

for food location would depend on the sensitive tip of the bill, as in other waders, rather than on the eyes. If birds choose this type of substratum they could feed at night, and it is possible that there is a tendency towards this behaviour further north where the midwinter days are so short.

Obviously there is great scope for a broad study of this interesting and rather atypical member of the genus *Calidris*, with its preference for rocky shores, its comparatively short migration and hence its northerly wintering grounds.

C. J. FEARE

News and comment

Edited by J. L. F. Parslow

A new R.S.P.B. reserve in the Outer Hebrides.—Hot on the heels of its recent announcement of a new heathland reserve in Dorset (*Brit. Birds*, 59: 208), the Royal Society for the Protection of Birds has now released details of another major new reserve, this time on North Uist in the Outer Hebrides, where the special attraction is the breeding Red-necked Phalaropes. Balranald Bird Reserve, as it is to be known, extends over 1,500 acres of *machair*, lochs and bogs on the western side of the island. It has been set up under an agreement with the land-owners and crofters of the area and contains the small township of Hougary, where Corncrakes and Corn Buntings still flourish on the traditionally farmed crofts. The reserve also includes a substantial length of sandy Atlantic coastline and the small off-shore island of Causamul, which is a breeding station for a few Grey Seals. Among the several lochs is Loch nam Feithean, overlooking which the R.S.P.B. intends to erect its now customary observation hides so that the phalaropes may be viewed without disturbance. Several species of ducks and waders breed on the reserve and the area also supports a considerable wildfowl population in winter.

Tucked away in the top left-hand corner of the map, North Uist seems decidedly remote to most of us. Yet, as George Waterston says in the July-August issue of *Birds*, Londoners can now fly to the Outer Hebrides via Glasgow in under three hours, and tourist pressures on these undisturbed islands can be expected to increase. Hence the urgent need to protect the rarer Hebridean species. Visitors to the reserve are asked first to contact the R.S.P.B. warden in Hougary.

Godman-Salvin medal for R. E. Moreau.—Since the first was awarded to W. Eagle Clarke in 1922 there had until this year been only ten recipients of the Godman-Salvin medal, one of the highest awards of the British Ornithologists' Union. At the annual general meeting of the Union last April its award to R. E. Moreau was greeted with acclamation, for few can have so richly deserved the honour or have been a more popular choice. An account of the many achievements of this amiable doyen of British ornithology is given in the July issue of *The Ibis*, the journal that he edited with such distinction from 1947 until he succeeded to the Union's presidency in 1960. In the same issue he contributes (with M. G. Ridpath) a paper on the ecology and evolution of the birds of Tasmania, which serves better than anything else to remind us of the enormous breadth of his knowledge and the lucidity of his writing. Reg Moreau's many pioneering papers have stimulated

ornithology for 40 years, and his many admirers now look forward to the appearance of his first book—on the ecology of African birds—which is soon to be published.

Growing importance of the I.U.C.N.—The ninth general assembly of the International Union for the Conservation of Nature, held in Lucerne, Switzerland, from 15th June to 2nd July, was attended by nearly 300 delegates and observers from 45 countries, including a contingent of 39 representatives from the United Kingdom. There were two particularly encouraging signs of the growing recognition of the importance of this body and of the international conservation movement it represents. The first was an announcement that the British government intends to lend its support to the I.U.C.N. as soon as the necessary formalities can be completed, and the second was the appearance for the first time at one of these conferences of the U.S.S.R., which sent a 16-strong delegation.

Habitat reports that one of the main themes of the conference was the impact of tourism and recreation, particularly on national parks. A recurring point made by speakers from many different parts of the world was that the growth of recreation should be steered away from national parks towards special recreational areas established elsewhere, leaving easily damaged wild places undisturbed. However, even within national parks and reserves the problem of tourist pressure is not insoluble, according to one speaker from British Columbia, who produced the interesting thought that 'modern human feet automatically stay on prepared surfaces if they are correctly located', thus allowing a wild flora to grow unharmed even at the edges of heavily used trails. A second main theme of the conference concerned the work of the Survival Service Commission, which includes the keeping of the 'Red Book' files to record information on birds, mammals and other organisms threatened with extinction. These files are now reproduced in miniature lithographic form and are purchasable as two loose-leaf volumes on application to the I.U.C.N. at 1110 Morges, Vaud, Switzerland. A popular version of them in book form, edited by James Fisher, Noel Simon and Jack Vincent, copiously illustrated and giving additional detail about some of the interesting species, is to be published by Collins in 1967.

Editorship of 'The Ibis'.—Dr. James Monk, editor of *The Ibis* since 1960 (and assistant editor for four years before that), reached the end of his term of office with the April issue. His successor is the Rev. P. H. T. Hartley, a former member of the Edward Grey Institute and well known particularly for his work with the Royal Society for the Protection of Birds (including Chairman of Council 1961-66).

Recent reports

By I. J. Ferguson-Lees

(These are largely unchecked reports, not authenticated records)

For various reasons it has been impossible recently to keep this feature up-to-date and there is now a gap of over six months since the summary covering January-February was published in our March issue (*Brit. Birds*, 59: 124-125). Such a gap cannot be bridged in one issue and we think it best to give the more recent reports now. Accordingly, the summary below is mainly concerned with the ten weeks from July into September and it is hoped to publish a retrospective picture of the ring period in a future issue.

SHEARWATERS, GULLS AND TERNS

Movements of the rarer shearwaters have been on a rather small scale in comparison with those of recent years. There was little sign of any spectacular passage of **Cory's Shearwaters** *Procellaria diomedea* and **Great Shearwaters** *Puffinus gravis* off the west coast of Ireland and, although **Sooty Shearwaters** *P. griseus* were seen in various areas, even these seem to have been fewer than usual. In late August and early September, however, several small shearwaters were reported off south-west Ireland and some of these may prove acceptable as **Little Shearwaters** *P. assimilis*.

Reports of **Pomarine Skuas** *Stercorarius pomarinus* included sightings at Dungeness (Kent) on no less than four days in August. A spectacular movement of **Common Gulls** *Larus canus* occurred at Fair Isle (Shetland) when 3,500 arrived suddenly on 10th August and had almost all gone by the next day. Among **Sabine's Gulls** *L. sabini* were one at Cape Clear (Co. Cork) on 26th August and another at Carnsore Point (Co. Wexford) in mid-September. **Little Gulls** *L. minutus* continued to make nonsense of their former status as rare vagrants away from the east coast: inland counties reporting them in August included Derby, Stafford (seven together), Warwick, Northampton, Middlesex and Somerset, while Cape Clear had its first-ever records. **Mediterranean Gulls** *L. melanocephalus* were seen at several places on the south and east coasts, and included one near Clevedon (Somerset) during 7th-14th August and a ringed bird following a plough near Skegness (Lincolnshire) on 29th July.

Inland movements of terns seem to have been larger than average in some areas, but there was no really big passage of **Black Terns** *Cblidonias niger* in July and August. Small numbers were seen throughout July, and especially in the second half of August when parties of ten to 20 appeared in various localities west to Somerset and north to Cheshire, Nottingham and Northumberland from the 21st onwards. With these came a total of seven **White-winged Black Terns** *C. leucopterus*, mostly birds of the year, in Kent (two), Sussex, Middlesex, Northampton, Lincoln and Somerset in the few days from the 22nd, one or two of them staying into September. Among **Gull-billed Terns** *Gelochelidon nilotica* was one at Gibraltar Point (Lincolnshire) on 10th September. **Caspian Terns** *Hydroprogne tschegra*, with nine records, were more numerous than in any previous year: after sightings at Cley (Norfolk) on 10th June and Holme Pierrepont (Nottinghamshire) the next day, there was a total of four in July, on the Axe estuary (Devon) on the 6th, at Chichester (Sussex) on the 11th, at Minsmere (Suffolk) on the 14th and at Leighton Moss (Lancashire) on the 25th-26th; in August Leighton Moss and Minsmere had further visits on the 14th and 23rd respectively, while Nottinghamshire had its second of the year (and also only its second this century) the next day over the River Trent near Beeston Weir.

NORTHERN AND AMERICAN WADERS

July sees the start of the autumn wader migration, which really gets under way towards the end of that month and in August. This seems to be a good year for **Spotted Redshanks** *Tringa erythropus*, with up to 60 in Suffolk, up to 45 in Kent, up to 20 in Dorset and up to 15 as far west as Somerset, the peak period for these and other northern waders having been the week from 20th August. **Wood Sandpipers** *T. glareola* have also been common with records as far west as Lancashire, Pembroke, Somerset and even Cos. Cork and Kerry. On the other hand, neither **Curlew Sandpipers** *Calidris ferruginea* nor **Little Stints** *C. minuta* have been particularly numerous. Five **Temminck's Stints** *C. temminckii* were seen in Cornwall, Suffolk, Lincoln, Durham and Stafford during July to early September.

It is also proving a good autumn for American waders. Curiously, very few

RECENT REPORTS

Pectoral Sandpipers *C. melanotos* seem to have come over and only about half a dozen were reported, all in southern England and Ireland, between the end of July and early September. On the other hand, three **Baird's Sandpipers** *C. bairdii* were seen on Tresco (Isles of Scilly) and at Frampton (Gloucestershire) and Hardney (Lincoln) between 26th August and early September; and **White-rumped Sandpipers** *C. fuscicollis* at Minsmere and Cape Clear on 9th-15th August and 8th-9th September. Late August also produced **Lesser Yellowlegs** *Tringa flavipes* at Braunton Pill (Devon) and Hayle (Cornwall), a **Wilson's Phalarope** *Phalaropus tricolor* at Hayle and a **dowitcher** *Limnodromus* sp. at Milton Creek (Kent), while an evident new influx in mid-September brought a **Lesser Golden Plover** *Pluvialis dominica* in Co. Cork, a **Buff-breasted Sandpiper** *Tryngites subruficollis* in Somerset, a **Solitary Sandpiper** *Tringa solitaria* in Wiltshire, more **Lesser Yellowlegs** in Northamptonshire and on the Lincoln/Norfolk border, a **Semi-palmated Sandpiper** *Calidris pusilla* on Lundy (Devon) and no less than four **Least Sandpipers** *C. minutilla* on Lundy (two) and in Cornwall and Co. Cork. The **American Pied-billed Grebe** *Podilymbus podiceps* at Chew Valley Lake (Somerset) (*Brit. Birds*, 59: 1932) reappeared and was seen regularly in August.

IRRUPTION OF CROSSBILLS

As everyone will now know, another irruption of **Crossbills** *Loxia curvirostra* is in progress. The first reports came from the east coast between Shetland and Yorkshire on 12th and 13th June. Numbers were small for the next fortnight, though by the 24th there were parties of up to a dozen in, for example, Suffolk and Devon. Then the last days of June and the first few of July saw the beginning of the big arrivals. Flocks of up to 30 appeared in Derby, Cheshire and several eastern counties, up to 80 in Devon, 100 in Dorset and 'hundreds' in Hampshire in the area of the New Forest, with smaller numbers west to Anglesey, Brecon, Hereford and Somerset. About 9th-10th July there was clearly another wave and the numbers rose sharply again in some eastern counties, while flocks of 100 and 300 were noted in Surrey and Brecon respectively; yet in Northumberland there was only one report for the whole of July. Some appeared anew on the east coast at the end of the first week of August and evidently another small wave arrived in late August (when there was also evidence of southward passage in Caernarvonshire and Pembroke-shire), though by this time many of the big flocks had passed on. The irruption of 1962-63 included a number of **Parrot Crossbills** *L. pytyopsittacus* (*Brit. Birds*, 57: 197-501) and so it is worth noting that about ten birds in the New Forest on 27th-30th August were thought to be of this species. Two **Two-barred Crossbills** *leucoptera* were identified in Hertfordshire and Norfolk in September.

MORE FALLS OF SCANDINAVIAN MIGRANTS

Following the big fall of Scandinavian passerines and other migrants in early September 1965 (*Brit. Birds*, 58: 528), the full analysis of which will be published in our next issue, any similar but smaller occurrence was bound to seem a pale shadow. Nevertheless, it is interesting that there were two or three medium-sized falls of this kind on the east coast from Shetland to East Anglia in the week or so following 26th August. The species most widely commented on were **Pied Flycatchers** *Ficedula oleuca*, **Garden Warblers** *Sylvia borin*, **Willow Warblers** *Phylloscopus trochilus* and **Redstarts** *Phoenicurus phoenicurus*, with **Wheatears** *Oenanthe oenanthe* and **Whinchats** *Ficedula rubetra* prominent in some areas, but many other birds were also involved. The scarcer ones included **Barred Warblers** *Sylvia nisoria* (up to nine on Fair Isle and others down to Dungeness and even across in Co. Wexford), **Wrynecks** *Jynx torquilla* (up to seven at Minsmere), **Bluthroats** *Luscinia svecica* (up to five on Outer Hebrides, Shetland), **Ortolan Buntings** *Emberiza hortulana* (later three at Cape Clear

during 4th-6th September), **Red-backed Shrikes** *Lanius collurio* and **Great Spotted Woodpeckers** *Dendrocopos major*.

Rarities associated with this movement included **Scarlet Grosbeaks** *Carpodacus erythrinus* on Fair Isle, a **Booted Warbler** *Hippolais caligata* at the same place on 28th-31st August, a **Greenish Warbler** *Phylloscopus trochiloides* at Bamburgh (Northumberland) on the 30th, two **Arctic Warblers** *P. borealis* elsewhere in Northumberland during the 28th-31st, and about 25 **Icterine Warblers** *H. icterina* from Shetland to Kent and round to Caernarvonshire and Co. Cork.

OTHER RARITIES FROM SOUTH AND NORTH

The July-August period also produced a scattering of southern rarities. In July these included a **Cattle Egret** *Bubulcus ibis* (which may prove to have been an escape) at Egginton sewage-farm (Derbyshire) on the 12th; a **Little Egret** *Egretta garzetta* at Frampton (Lincolnshire) at the end of the month; **Pratincoles** *Glareola pratincola* at Holywell Ponds (Northumberland) on 2nd-6th and Cley (Norfolk) on the 3rd, following one at Grafham Water (Huntingdonshire) on 26th June; a **Roller** *Coracias garrulus* at Retford (Nottinghamshire) on the 8th-10th; a **Great Reed Warbler** *Acrocephalus arundinaceus* at Minsmere on the 7th; and a **Rose-coloured Starling** *Sturnus roseus* at Voe (Shetland) for two weeks. In August they included a **Flamingo** *Phoenicopterus ruber* at Sandwich Bay (Kent) on the 18th, which, unlike most others in recent years, was considered to be of the European race; a **Red Kite** *Milvus milvus* at Beddington (Surrey) in the second week of the month; a **Marsh Sandpiper** *Tringa stagnatilis* at Chigwell sewage-farm (Essex) for several days in the third week; a **Bee-eater** *Merops apiaster* at Chew Valley Lake on the 15th; **Aquatic Warblers** *Acrocephalus paludicola* at Chew Valley Lake, at Slapton (Devon) and at Queen Mary Reservoir (Middlesex) on the 13th, 19th and 20th, the last staying to the end of the month; and a **Blue Rock Thrush** *Monticola solitarius* on North Ronaldsay (Orkney) on the 30th (this species is not even on the British List and the question of escapes is being explored).

Rather fewer reports than usual of **Melodious Warblers** *Hippolais polyglotta* included one on Bardsey (Caernarvonshire) on 25th-26th August and two on Cape Clear on 9th and 11th September. In the spring at least three **Hoopoes** *Upupa epops* were recorded as far north as Scotland, but August and early September were very poor for these birds. Several reports of **Kentish Plovers** *Charadrius alexandrinus* in August ranged from three at Sandwich Bay on the 9th to others as far west as Brecon and Somerset on the 11th and 20th. Late August, from about the 20th, also seemed to produce an unusual number of **Black-necked Grebes** *Podiceps nigricollis* in the part of England bounded by Lancashire, Lincoln, Somerset and Middlesex. **Red-headed Buntings** *Emberiza bruniceps*, as usual doubtless escapes, were well scattered in July and August, and reports came from a dozen or more counties north to Anglesey in the west and Shetland in the east.

Finally, a few northern birds. A **Gyr Falcon** *Falco rusticolus* was identified at Baltasound, Unst (Shetland) on 2nd-4th August, but may have been in the area for some time. A **Hawk Owl** *Surnia ulula* near St. Ives (Cornwall) on 14th August was the first reported since one in Lancashire in September 1959. **Snowy Owls** *Nyctea scandiaca*, possibly only one individual, continued to be seen on various islands in Shetland in July and August, while one also appeared in the Isle of Wight, Hampshire and Dorset during July; this latter may well have been an escape (see *Brit. Birds*, 59: 291-292). The first **Fieldfares** *Turdus pilaris* arrived early: five on Fair Isle on 4th August increased to 20 by the 7th, and one was also found about four days dead on the Farne Islands (Northumberland) on the 9th. Equally early was a **Brambling** *Fringilla montifringilla* on Fair Isle on 7th-9th August, followed by one or two more from the 27th onwards.

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John Warham, W. R. P. Bourne and H. F. I. Elliott

(with eight plates)

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News and comment

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FOUR SHILLINGS



British Birds

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British Birds

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SEPTEMBER 1966



The great immigration of early September 1965

By Peter Davis

British Trust for Ornithology

A VAST FALL of North European migrants occurred on the east-facing coast of East Anglia on 3rd September 1965. Arrivals on a less spectacular scale also took place along most of the east coast of Britain north to Shetland about this time, and large movements were seen at Ierland in Holland and at Heligoland. The object of this paper is to bring together the records of these falls, and to relate them to the weather-pattern of the period.

'Rushes' of the common summer visitors to north-west Europe in the last week of September have been a recurrent and prominent feature of autumn migration on our North Sea coast during the past decade. The main species involved in them are the Wheatear, Whinchat, Redstart, Garden Warbler, Willow Warbler and Pied Flycatcher,* species which migrate SSW from Scandinavia to Iberia on the first stage of their autumn passage. The widespread falls of 1956 and 1958 were described and discussed by Williamson (1959), and those of 1963 were more briefly reviewed by the present writer (1964). Smaller and more local falls of similar composition have occurred in this week in many other post-war years, though it is curious that there have been no large series since 1956 while the previous ten years, when several of our east coast observatories were already operating, saw no arrivals of comparable strength so early in the autumn. There are occasional references to 'rushes' at the beginning of September in the works of such earlier students of the east coast passage as the Misses E. V. Dexter and L. J. Rintoul, W. Eagle Clarke, B. B. Rivière, and C. B. Beechurst, but this period does not achieve the same pre-eminence in

*Scientific names of species involved in this immigration and mentioned in the text are given in an appendix on pages 375-376; references to other species in the discussion are followed by the scientific name in the usual way.

their writings as it would in similar works today. Although such falls depend largely on the chance occurrence of easterly winds in the North Sea, and probably never involve more than a fraction of the total populations, it is interesting to speculate that there may have been some slight change in the annual cycle of these common species, or some long-term climatic change, which has contributed to their more abundant appearance on our east coast at the beginning of September in the past ten years.

The fall of 3rd September 1965 in Suffolk was by far the heaviest of its kind ever recorded in Britain. Axell and Pearson (1966), in a very detailed account of events in the county, have estimated that more than half a million birds descended along the 24 miles of coast between Sizewell and Hopton on this day. I have been unable to find any record of a fall of migrants in this country in such concentration, though taking the east coast as a whole there may have been visible falls involving comparable numbers over a much wider area.

In east Norfolk the fall of 3rd September has probably never been matched, though densities there were evidently much lower than in Suffolk; while in north Norfolk the arrival was the largest of its kind experienced by R. A. Richardson in the past twenty years and has few, if any, rivals in the earlier records. Further north the numbers were often 'good', but by no means unprecedented.

Many species apart from the familiar summer visitors were of course concerned in these great movements; Axell and Pearson list 78 species they consider to have been involved in Suffolk alone, and a few others could be added from other areas. The total includes many northern waders, some raptors and waterfowl, and a number of rarities (though, if one discounts Wrynecks and Bluethroats, these were remarkably few). The number of Wrynecks recorded is one of the most extraordinary features of the period; even the most conservative reckoning gives a score of 280 seen, and it is likely that there were many hundreds in East Anglia alone. The Bluethroat totals, allowing for the bird's very skulking habits, cannot have been much lower. The westernmost populations of both species are thought to migrate SSW in autumn (unlike those of most other east-coast rarities), so that the number of records might be expected to increase roughly in proportion to the numbers of commoner species taking part in the same type of movement, but this can hardly be the whole explanation of the fantastic quantities on this occasion.

THE GENERAL SITUATION

During the last ten days of August the weather had been unsettled, with much cloud and rain, over most of Scandinavia. It is unlikely that in these conditions there had been much early emigration, and

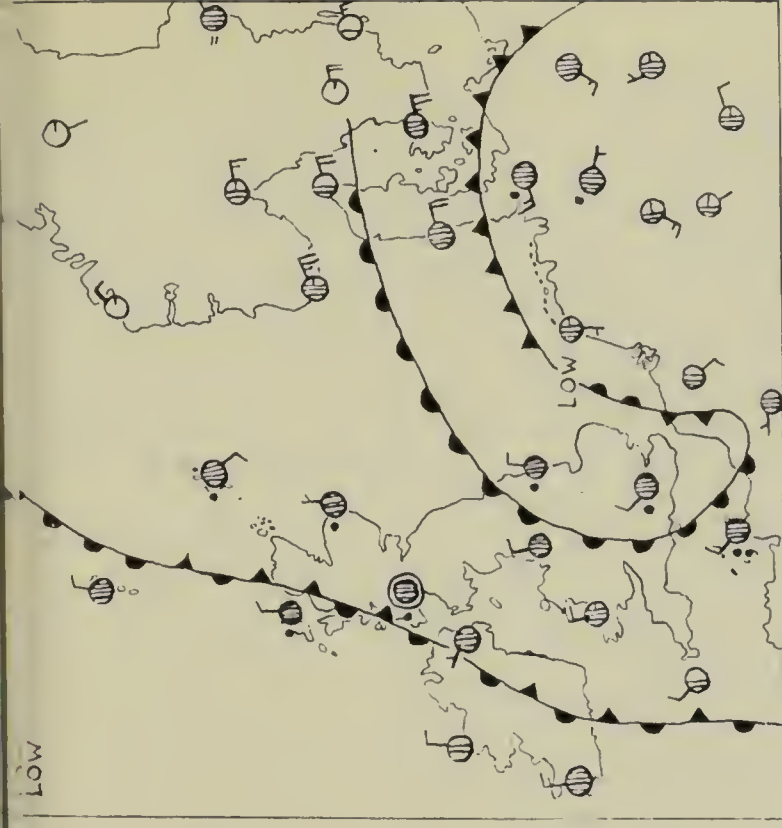
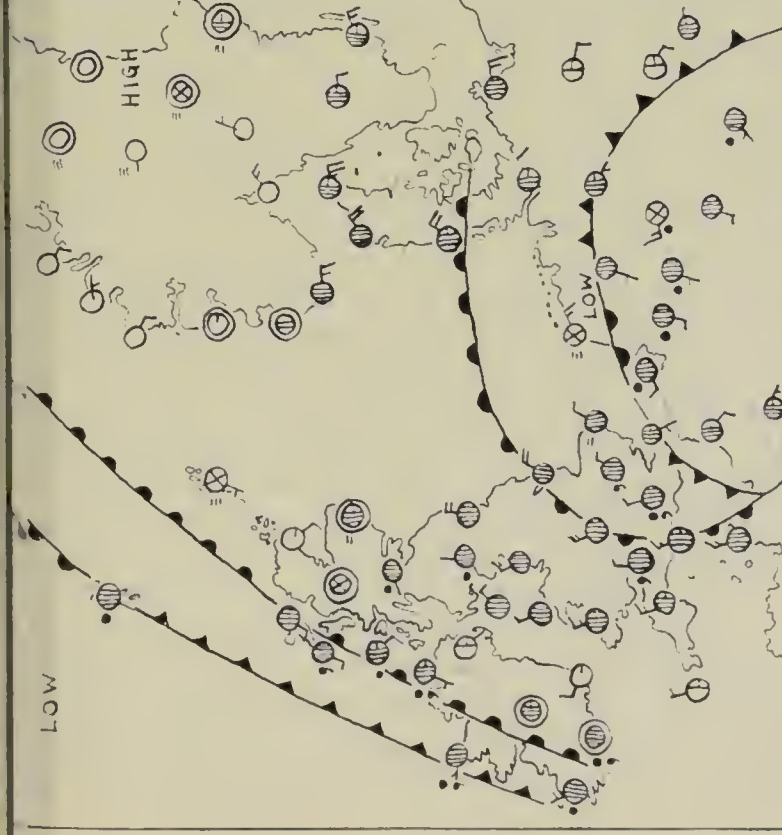


FIG. 1. Weather map for 06.00 hours GMT on 3rd September 1965

At 06.00 a large arrival was taking place at Vlieland in the Netherlands, ahead of the northward-moving rainbelt; and some birds were arriving at Spurn (Yorkshire) and elsewhere on the east coast of England. At 12.00 considerable falls of migrants were occurring in the northerly airstream from Norfolk north to Yorkshire, and the mass arrival in Suffolk was to follow during the next two hours as the front (accompanied by a shift of wind direction to the south-east) reached the coast

certainly, in the absence of easterly winds in the North Sea area, there had been no east coast arrivals of Scandinavian birds in Britain since a series of small falls about 15th August. Conditions became more appropriate to emigration from about the 31st, and by 1st September an anticyclone was established over central Scandinavia, bringing mainly light winds and clear skies. This high, which shifted slowly north-east during the first days of September, was probably ultimately responsible for releasing a mass emigration which resulted in spectacular falls far to the south.

During these few days pressure was low to the south of Scandinavia; a mainly east to north-east airstream covered most of the North Sea basin, and there were large areas of overcast with rain, which would contribute to the disorientation of migrants.

On 31st August a shallow depression (Low 'M' of the Daily Weather Report) was near north Denmark, drifting south and filling. By the evening of 1st September, this low was absorbed into the circulation of a more vigorous depression (Low 'N') which had appeared over north Italy and had commenced to move north-west across France. Low 'N' had reached northern France by the night of the 2nd/3rd, where the centre filled as a secondary (Low 'O') developed on the cold front over the Low Countries (fig. 1). The original warm front, which is shown straddling the southern North Sea basin, appears no longer to have been giving much rain except in south-east England, and the main rain-belt on the early morning of the 3rd extended across south-east England and the Low Countries to north-west Germany. Low 'O' moved NNW over the North Sea past East Anglia during the 3rd, bringing heavy rain to most coastal areas of eastern England during the day, accompanied by a shift of wind from the north to the south-east as the front passed in Suffolk and east Norfolk. The main falls of migrants in these areas occurred with the arrival of the heaviest rainfall shortly after noon (fig. 2). Winds soon veered through south-west to north-west on the south side of the Low, and by early on the 4th, when it was off the Northumberland coast, all coastal areas to the south were in a north-west airflow. Arrivals on the 4th were virtually confined to Scotland and the extreme north-east of England. By evening on the 4th the Scandinavian high had retreated far to the north-east and there was some rain in southern Scandinavia, which would perhaps have discouraged further emigration; and indeed it is doubtful if there were any fresh arrivals in Britain on the 5th. The rain had largely cleared again by the 5th in south-west Scandinavia and this was presumably the source of a large migration brought down at Heligoland with the passing of a cold front in the early hours of the 6th. There followed a more persistent deterioration in the weather over northern Europe, during which further large emigrations would be unlikely to occur.

THE ARRIVALS

Wednesday 1st September

A very small number of presumably Scandinavian night-migrants appeared at the coastal stations from the Wash northwards on this day. *Fair Isle* (Shetland) received a few Whinchats and Willow Warblers and a Garden Warbler, and the *Isle of May* (Fife) some Willow Warblers; and Redstarts appeared at *Holy Island* (Northumberland) and at *Spurn* (Yorkshire), with six Pied Flycatchers at the latter station, two at *Gravelly Point* (Lincolnshire) and one and a Garden Warbler at *Holme* (north Norfolk). There are no reports of arrivals elsewhere in East Anglia nor in Kent. These migrants would probably have flown from western Norway, where there were easterly winds on 31st August, and have travelled in a north-east to northerly airstream north and west of the Low 'M' (off Denmark).

Thursday 2nd September

On the second day of arrivals there were considerable movements at *Fair Isle* and from *Spurn* to the Blakeney-Cley area (north Norfolk), but very few at the intervening stations. A few birds appeared on the Norfolk coast and better numbers at Sandwich Bay in Kent. Overnight there had been light easterly winds in southern Scandinavia and a stronger north-east to NNE flow over the greater part of the North Sea, becoming northerly in the extreme south. Eastern Scotland (except the far north) and north-east England had fine weather (which may have minimised any arrivals there), but there was extensive cloud and some rain-showers from Yorkshire southwards.

At *Fair Isle* the newcomers were mainly Willow Warblers (30), Garden Warblers and Pied Flycatchers (both about 20), with a few other birds including three Barred Warblers. The *Isle of May* reported only 1 Pied Flycatcher and a Red-backed Shrike, and apparently there were virtually no increases in Northumberland, though two Barred Warblers were recorded on *Holy Island*. At *Hartlepool* (Co. Durham) there were few arrivals also, but *Spurn* had a varied fall, with over 30 Whinchats, about 15 Wheatears and Garden Warblers, a few Redstarts, and representatives of a dozen other species. Odd chats appeared in the census area at *Tetney* (north Lincolnshire), and at *Gravelly Point* a minor fall included about ten Garden Warblers and 1 Flycatcher. Numbers at *Holme* were similar, but more Wheatears; and an Icterine Warbler was also seen.

This was a good day at *Blakeney Point*, with 40 Wheatears, 30 Garden Warblers, 20 Redstarts, and small numbers of many other species. Wrynecks were present. The only reports of arrivals on the Norfolk coast on the 2nd came from *Benacre*, where A. G. Hurrell trapped a Bluethroat and several other migrants; and from *Walbers-*

wick, where several Pied Flycatchers, Tree Pipits, and Siskins appeared. Further south, a fall of some 40 Pied Flycatchers, 20 Redstarts, and 20 Garden Warblers at *Sandwich Bay* (Kent) had an obviously 'Continental' flavour; this fall was reflected at *Dungeness*.

Dr. C. D. T. Minton reported that at *Vlieland*, off the Dutch coast, a good arrival of small migrants occurred on the 2nd; the majority were present in the afternoon with a clearing sky and calm conditions, which gave way to light easterlies late in the day. The species involved were Redstart, Garden Warbler, Pied and Spotted Flycatchers, Whinchat and Wheatear in similar density to that of a 'moderate to good fall' on the east coast of England. No arrivals were reported from *Heligoland* on the 2nd.

It is evident that a substantial movement had occurred over much of the North Sea area on the 2nd, presumably as the result of departures from Scandinavia on the previous evening. Many birds must have been deflected to the west in the east wind belt in the northern part of the area, though from the weather maps (which include no observations made over the sea) it appears unlikely that there was anything approaching full overcast over the relevant part of the North Sea. The next wave was to run into more formidable difficulties.

Friday 3rd September

On the evening of the 2nd the weather in Scandinavia continued ideal for migrant departures, with little cloud and calm conditions over a wide area, and light easterlies in the south and west. The weather over the North Sea was steadily deteriorating from the south, however, and by dawn there was extensive cloud as far north as central Scotland and the Skagerak, with local fog patches in several places. It rained heavily in south-east England overnight and, although there were some breaks in the early morning on the Suffolk coast, the rain soon resumed there and became torrential in the late morning, continuing until evening. The rain seems to have reached north Norfolk by mid-morning, while at Spurn it began to drizzle at 11.15 GMT and to rain heavily at 11.45, with only brief lulls later in the day. On the Northumberland coast there was early drizzle, and heavy rain from soon after midday, and eastern Scotland was affected during the afternoon. Fair Isle remained dry until evening. At *Vlieland* it had started to drizzle at 08.00 and rained heavily from 11.00. Migrants crossing the North Sea would therefore have encountered an extensive barrier of adverse weather to the south. Although some east coast falls began in dry overcast and NNE winds before the rain set in, there seems to be general agreement that from Suffolk north to Yorkshire the main arrival coincided with the heaviest rain, which suggests that a great concentration of dis-

oriented birds had accumulated near the front. If the weather map is to be relied upon, the front impinged upon the east coast at a very acute angle, which would account for the nearly simultaneous peak falls along much of the coast. Unfortunately I have no details of arrival times at the stations north of Spurn.

At *Fair Isle* the main additions on the 3rd were 100 Common Gulls and 50 Garden Warblers, whilst Wheatears increased considerably. About 15 Redstarts, Whinchats and Tree Pipits came in, with a selection of other migrants including a Wryneck, a Bluethroat and two more Barred Warblers. At the *Isle of May* Garden Warblers (200) were by far the commonest birds, with Pied Flycatchers (50), Redstarts (40), Whinchats (30) and Willow Warblers (20) also prominent; among other records were four Wrynecks and three Barred Warblers. *Holy Island* received about 50 small migrants, and there were fewer at *Bamburgh* and *Auxley*, and in the *Blyth* area. The *Hartlepool* observatory fared better (considering the small area covered) with over 100 newcomers, mainly Wheatears and Willow Warblers. The *Teesmouth* area produced a few reports of the common species and an Icterine Warbler was seen.

At *Spurn* the falls began with a 'fairly good' arrival of Redstarts, Pied Flycatchers and Garden Warblers between 07.00 and 08.00 hours, and a main fall of Wheatears about 10.00-10.30 in the period before the rain began. A much larger fall, mainly of Redstarts, Pied Flycatchers and Garden Warblers, but also involving many other species, took place in heavy rain some time between 12.00 and 16.00. Estimates late in the day showed that at least 300 Redstarts and over 100 Wheatears, Garden Warblers and Pied Flycatchers had arrived. Other records involved a variety of waders, 50 Whinchats, 40 Siskins, 30 Tree Pipits, a Barred Warbler, a Red-breasted Flycatcher, four Red-backed Shrikes, and many others.

At *Tetney*, on a morning count, only some 15 night-migrants were found, and at *Gibraltar Point* the scores were surprisingly low though a fair cross-section of species was represented; perhaps both places suffered from a 'drift-shadow' effect in nearly northerly winds.

On the opposite corner of the Wash, at *Holme*, a 'big influx' occurred from 08.30, with a peak at about 12.30-13.00, in driving rain from the north-east. By then there were 'uncountable numbers' of birds in the flying dunes and bushes. A count in the small fir-plantation at the dark period gave 100 Redstarts and 50 Garden Warblers, with small numbers of the other common species, two Wrynecks, a Bluethroat, and an Icterine and two Barred Warblers; there were also over 40 Wheatears in the vicinity.

At *Blakeney/Cley* the day started overcast with poor visibility; steady rain came on during the morning and continued for the rest of the day, which made observations extremely difficult. During the after-

noon it was estimated that at least 200 Redstarts and as many Garden Warblers, also numerous Wheatears, had arrived on the Point, together with small numbers of Whinchats, Pied Flycatchers, Tree Pipits, Siskins, at least seven Wrynecks and six Bluethroats, an Aquatic Warbler, a second Barred Warbler, and various other birds. Migrants were still arriving at dusk, but overnight the wind became south-west and it is unlikely that there were further arrivals on the 4th. The counts for this day will therefore give a better idea of the numbers involved. R. A. Richardson, who collected records from a number of other observers, stated that along seven miles of coastline from Salt-house to Blakeney Point there were at least 500 Redstarts, nearly as many Wheatears and Garden Warblers, and more Whinchats and Lesser Whitethroats than had been appreciated on the 3rd, but still only very small numbers of Pied and Spotted Flycatchers and Willow Warblers. The most astonishing feature was the number of Wrynecks (at least 27 seen) and Bluethroats (at least 12). Five Barred Warblers, two Ring Ouzels, several Robins and three Red-backed Shrikes were present, and among non-passerines several Spotted Redshanks and Black Terns, as well as at least six Dotterels. Although Pied Flycatchers were scarce at the coastal sites in Norfolk, it should be mentioned that two people reported them very prominent a few miles inland during the 4th-5th, so perhaps they moved quickly into more suitable habitats.

M. J. Seago kindly forwarded other coastal and inland records that he received, and said that very large numbers of the common migrants were present 'in every coastal parish from Holme to Gorleston'. At *Holkham* pines (between Holme and Cley) some 70 Redstarts and 30-40 Pied Flycatchers were present on the afternoon of the 3rd, and up to four Wrynecks were seen there. East of the Cley area, there were several reports of Wrynecks at *Sheringham*. In the *Cromer* district, 'incredible numbers' of Redstarts arrived on the 3rd, and after dark many were flying around the street-lights and attempting to enter buildings. There was also a 'heavy influx' of Wheatears there, with many Whinchats and 'large numbers' of Spotted Flycatchers. Several Wrynecks, a Bluethroat, and ten Siskins were also reported. Other coastal Wryneck records came from *Mundesley*, *Waxham*, *Hickling* (up to four seen), *Scratby* and *Yarmouth*, and many Redstarts and Spotted Flycatchers were still present at *Ostend* (near Happisburgh) on the 5th.

G. R. South was making regular observations on the *Winterton* nature-reserve, an area including nearly three miles of coast, about eight miles NNW of Yarmouth, from the 3rd. His largest estimates, made early on the 4th and thought to be 'very conservative', gave 1,000-1,500 Redstarts, 500-700 Pied Flycatchers, several hundred Wheatears and Willow Warblers, many Garden Warblers, at least 150 Spotted Flycatchers, and smaller numbers of Whinchats, Whitethroats

and Lesser Whitethroats. Other species present included Cuckoo, Grasshopper Warbler, Barred Warbler, Tree Pipit and Siskin, also several Wrynecks (maximum five on the 7th) and a Red-backed Shrike on the 6th. Here also there was no further fall after the 3rd.

No details are available for *Yarmouth*, although it is known that many migrants appeared in the town. Close by, at *Gorleston*, there were 'vast numbers' of Wheatears, Redstarts and Spotted Flycatchers, 'very large numbers' of Whinchats and 'large numbers' of Tree Pipits, but very few Garden Warblers and Whitethroats; Wryneck and Siskin were also recorded.

For the Suffolk records I am indebted to H. E. Axell and D. J. Pearson, who have collated the observations of many bird-watchers in the county, and who have given me copies of the original data and of their very detailed account prepared for a local journal (Axell and Pearson 1966). From this it is apparent that very few birds had arrived overnight on the 2nd-3rd, and that the main influx came all along the north Suffolk coast with very heavy rain and a sudden shift of wind from north to south-east in the early afternoon.

At *Lowestoft*, at 13.15 GMT, a huge cloud of small birds was seen to appear over the town, moving towards the south, with individual birds dropping out continuously; the town itself was soon alive with birds hopping about in every garden and open space, on walls and television aerials, in all the streets (where many were killed by traffic), on the sea-wall and even among the groynes on the beaches. Two people in different parts of the town had the extraordinary experience of Redstarts descending from the mass of migrants overhead and alighting on their shoulders. Apart from the vast numbers of small birds, many Redstarts landed on the sea-front, and a number of ducks and sea-birds (including Little Gulls) were seen along the shore. Local ringers were able to make large catches on the following days, including 17 Wrynecks in one small area. Several Ring Ouzels, a Wood Warbler and a Red-breasted Flycatcher were found subsequently.

What was perhaps the same great mass of migrants was also seen flying along the coast at several points up to three miles south of Lowestoft at about the same time. On the morning of the 4th a survey was made of this three-mile stretch from Lowestoft to Pakefield, and it was estimated that no less than 30,000 birds were seen. Redstarts were much the most numerous, followed by Wheatears, Pied Flycatchers and Whinchats (thousands of each), Spotted Flycatchers and Whitethroats (many hundreds), and Willow and Garden Warblers (several hundreds). There were also a good many Lesser White-throats, over 50 Tree Pipits, well over 30 Wrynecks, at least seven Whitethroats, a Barred Warbler and a Red-breasted Flycatcher.

Further south, at *Benacre Pits*, most of the birds appeared between

13.20 and 13.50 GMT, many thousands arriving along a half-mile front. Pied Flycatchers and Redstarts were the most abundant, but there were huge numbers of Wheatears, hundreds of Whinchats, Garden Warblers and Willow Warblers, smaller numbers of Spotted Flycatchers, Tree Pipits, Whitethroats and Robins, and at least 20 Wrynecks. Between the start of the arrival on the 3rd and early on the 5th (when he ran out of rings) A. G. Hurrell caught some 650 migrants there, of which half were Pied Flycatchers (a much higher proportion than was seen at other places); also included were 14 Wrynecks, two Bluethroats, three Icterine Warblers and an Ortolan Bunting.

At *Covehithe* too the fall was massive and was estimated at a density of 100 birds per acre near the shore on the 3rd, with Redstarts predominant. At *Southwold* the arrival occurred mainly between about 13.00 and 14.30, though some birds continued to come in until about 17.00. Estimates over a restricted area early on the 4th gave over 1,000 Redstarts, several hundred Wheatears, more than a hundred each of Whinchats and Pied and Spotted Flycatchers, and smaller numbers of Robins, the common warblers and Tree Pipits. Other birds included at least ten Wrynecks, two Bluethroats, twelve Black Terns, and many Whimbrels, Greenshanks, Spotted Redshanks, Green, Wood and Common Sandpipers, and Ruffs.

At *Walberswick* there were no detailed observations on the afternoon of the 3rd, though it is known that great numbers of birds arrived then. Early on the 4th D. J. Pearson covered a two-mile stretch of coast south of the village, and in this walk encountered an estimated 15,000 Redstarts, 8,000 Wheatears, 4,000 Pied Flycatchers, 3,000 Garden Warblers, 1,500 Whinchats and as many Tree Pipits, 1,000 Willow Warblers, 500 Whitethroats, and smaller numbers of Spotted Flycatchers and Robins. His other figures for the day include at least 40 Wrynecks, 20 Ring Ouzels, 20 Bluethroats, a Great Reed Warbler (caught), an Icterine Warbler and two Barred Warblers; and among the waders 400 Dunlin, 350 Ruffs, 150 Redshanks, fewer Ringed Plovers, Greenshanks, Common Sandpipers, ten little and three Temminck's Stints, five Green and three Wood Sandpipers, three Curlew Sandpipers and a Kentish Plover.

On the R.S.P.B. reserve at *Minsmere* H. E. Axell and his colleagues were in the field throughout the arrival and the following days. Here the great numbers of birds appeared very suddenly at 12.15, a few minutes after the wind had freshened from the south-east. Small passerines were blown in over the coast to descend everywhere, though most of the woodland species quickly sought shelter among bushes and trees; many even entered the public hides and other man-made structures. At the same time large numbers of terns, waders, and some

icks came down into the marshland areas. Observations over about 60 acres of the reserve suggested that by evening (when a few migrants were still trickling in) the approximate numbers of the commoner species were as follows: Redstart 7,000, Wheatear 4,000, Garden Warbler 2,000, Pied Flycatcher 1,500, Whinchat 750, and Willow Warbler 500. It was later calculated, from sample counts, that probably 15,000 Redstarts, 10,000 Wheatears and 5,000 Pied Flycatchers, besides thousands of other birds, were present in the reserve area as a whole. Peak numbers of other species on this or the next days were Lapwing 110, Grey Plover 60, Golden Plover 250, Whimbrel 50, Redshank 100, Greenshank 60, Knot 100, Little Stint 20, Temminck's Stint two, Dunlin 700, Curlew Sandpiper 30, Sanderling 20, Puffin 60, Dotterel three, Black Tern and Common Tern each 150, Jackdaw three, Wryneck 25, Ring Ouzel five, Bluethroat 25, Robin 400, Serpentine Warbler two, Whitethroat 200, Lesser Whitethroat ten, Spotted Flycatcher 300, Tree Pipit 150, Tawny Pipit one, Red-backed Thrush ten, Siskin 40, Chaffinch 25, and Ortolan three. The wind had shifted to the north-west by the evening of the 3rd, and there was no suggestion of further arrivals during the next few days.

Winsmere seems to have been very near the southern limit of the mass arrival since densities were much lower at *Sizewell*, only a little further south, and at *Aldeburgh* there seems to have been no obvious fall on the 3rd although moderate numbers of Wheatears and a few of the other migrants were present there early on the 4th. The fringe of the movement does seem to have reached *Havergate Island* on the 3rd, with good numbers of the commoner passerines, some Wrynecks and many others (an American species, Baird's Sandpiper, was there from the 1st), but otherwise the coast south of the bend at Orford Ness was hardly affected. A few Wheatears and little else were seen along the coast at *Shingle Street* and *Bawdsey* early on the 4th, but there was no sign of migration at *Boyton* or at *Felixstowe*, nor does any fall appear to have been seen on the 3rd on the Essex and Kent coasts, except at *Dungeness*, where a number of Whinchats, Redstarts, and Garden Warblers appeared overnight. Some waders, including Little Stints, did never reach the London reservoirs and sewage-farms (notably *Perry's*) at dusk on the 3rd.

Across the North Sea at *Vlieland* (which is on the same latitude as *Spilth* in Lincolnshire and about 140 miles ENE of the nearest part of the English coast at Yarmouth) there were large numbers of migrants everywhere at 06.30, and a continuous increase went on all morning. The wind there was moderate south-east at dawn, increasing later, and the day was overcast and poor visibility at the start, drizzle from about 10.00, and heavy rain from 11.00. Dr. C. D. T. Minton reported that there were very many Wheatears, Whinchats, Redstarts, Willow and

Garden Warblers and Pied Flycatchers, also many Spotted Flycatchers, Chiffchaffs (a species scarcely detected in the falls in Britain) and Tree Pipits, and a huge increase of Little Stints and other waders; an Osprey was also seen.

At *Heligoland*, which had been very quiet on the 2nd, a small arrival of the common chats and warblers, with a Wryneck and a Bluethroat, occurred during the early hours of the 3rd, but there was no further increase during the day, apart from a (probably diurnal) movement of Tree Pipits and wagtails. An English observer, C. W. Holt, was present at this time. Apparently *Heligoland*, which is 130 miles ENE of *Vlieland* and roughly on a level with *Flamborough Head* (Yorkshire), escaped the very heavy rain to the west, though there was some precipitation during the night of the 2nd/3rd.

Saturday 4th September

By the night of the 3rd/4th only the extreme north-east of England and the Scottish coast remained in the east to north-east airflow and it appears that few if any new arrivals from Scandinavia occurred along the coastline to the south, though naturally there were many higher counts in the more southerly localities, with improved weather and an influx of weekend observers.

Reports from Magnus Sinclair in *Unst* (Shetland) showed that odd Pied Flycatchers, Wheatears and Redstarts were present at Harolds-*wick* on this day, but there was no large arrival there. This was certainly the peak day at *Fair Isle*, however, with Whinchats (110) increasing sharply and several other species showing their largest numbers of the period. Around 50-60 Redstarts, Willow Warblers and Pied Flycatchers were now present, and a score of 23 Whitethroats was the highest autumn total for this species since at least 1948. Other passerines included two Bluethroats, four Red-backed Shrikes and three Ortolans. Eight Wrynecks were seen, as well as the observatory's first Little Ringed Plover, and several wader species increased.

Reports from *North Ronaldsay* (Orkney) also suggested a considerable movement coinciding with the one at *Fair Isle*, but no detailed figures are available; Wryneck and Barred Warbler were among the migrants there. At the *Isle of May* there were no very substantial arrivals on the 4th, the greatest increase being only about 25 in the case of the Wheatear, and Garden Warblers were much reduced to about 75; a Bluethroat and a Red-breasted Flycatcher were among other migrants seen.

There were much larger numbers on the Northumberland coast, where the combined totals for the commoner species at four well-watched localities increased from insignificant numbers on the 3rd to some 420 Wheatears, 180 Whinchats, 140 Redstarts, 100 Garden

Warblers and 150 Pied Flycatchers on the 4th. At *Holy Island* there were also some 30 Willow Warblers, three Wrynecks, and two Red-backed Shrikes; at *Bamburgh* an influx of Sedge Warblers (18) occurred, also two Wrynecks, two Barred Warblers, a Greenish Warbler and various other birds; and at *Hauxley* the records included a Bluethroat, three Barred Warblers, five Red-backed Shrikes and an Ortolan Bunting.

The *Hartlepool* station had considerably more birds than on the 3rd, with Redstarts (30), Garden Warblers (33) and Pied Flycatchers (18) about twice as numerous, and a few more Wheatears (40), also an Osprey, a Red-backed Shrike and two Bluethroats. The *Teesmouth* figures (referring mainly to the South Gare) also reached a maximum, with some 20 Wheatears, 20 Pied Flycatchers, two Wrynecks and a Red-backed Shrike, also a Honey Buzzard, a Dotterel, and a party of 70 Whimbrels, the largest ever recorded in the area. There is, however, no strict comparison with the previous day.

At *Spurn*, in the opinion of the warden, B. R. Spence, most increases were probably artificial ones, due to better coverage on the 4th. Some of the common species had already decreased from late on the 3rd, but Whinchats (100) had probably been underestimated earlier, and there were now seven Wrynecks, two Icterines and three Barred Warblers, to mention only a few of the 'increases' over the 3rd.

The *Tetney* count showed little change, but at *Donna Nook* (opposite *Sourton*), which had not been visited on the 3rd, there were many birds which had presumably arrived on the previous day. They included at least 45 Whinchats, 30 Wheatears, 25 Redstarts, a Barred Warbler, a Red-backed Shrike and other species. The same qualification applies to *Huttoft Bank* (Lincolnshire) where ten Redstarts, a Bluethroat and an Icterine were found. At *Gibraltar Point* there were few changes to record, though an Osprey, two Wrynecks and a Wood Warbler appeared, and eight Green Sandpipers passed.

At *Holme* it seems that few birds remained early on the 4th, whilst another sizeable increase occurred during the afternoon, mainly of Whinchats, Wheatears, Redstarts and Garden Warblers. Seventeen Wrynecks were found in the vicinity, and a Red-backed Shrike. This flux can only have been an onward movement from the earlier falls. Neither at *Blakeney-Cley* nor in Suffolk was there any real evidence of further arrivals on the 4th, apart from at *Benacre* where A. G. Hurrell was convinced that more Willow Warblers had come in overnight. These could well have been British birds halting at the coast. Ospreys were seen at *Minsmere* (two) and at *Havergate*.

There were no further arrivals at *Heligoland*, apart from an Osprey and a few Siskins.

Sunday 5th September

It is extremely doubtful if there were further arrivals fresh from Scandinavia on this day, even in the far north, though both *Fair Isle* and *Isle of May* produced more Tree Pipits, and the former station also had a few more Fieldfares and Redwings, an Aquatic Warbler and three Bluethroats. Changes at most other places can be ascribed to onward movements; there were, for instance, more Garden Warblers at Holy Island, more Barred Warblers at several points, and more widespread records of Wrynecks and other species. An Aquatic Warbler appeared at Holme. Whitethroat numbers at Walberswick showed a marked increase, almost certainly due to a fall of British emigrants, for there were very heavy individuals among them, and it is likely that some other British birds (e.g. Sedge Warblers) were involved. A few more Whitethroats appeared at Spurn on this day, and more leaf-warblers at Holme.

Monday 6th September

Britain was now cut off from further immigration, but the vast fall on *Heligoland* in the early hours of the 6th should be mentioned, since it was essentially part of the same series of falls. C. W. Holt's description of the scene is reminiscent of the accounts from observers in Suffolk, for the small island was literally inundated with birds of the same species. The day's ringing total—1,047—was a record one for the long history of the bird observatory. Redstarts (364) headed the ringing list, followed by Pied Flycatcher (337), Garden Warblers (181), Whitethroats (47) and Willow Warblers (24); the others included five Ortolans, four Icterine Warblers, four Wrynecks, two Bluethroats and a Barred Warbler. More of all these, and many other species, were seen outside the trapping-garden. The total could have been much increased had more ringers been present. One interesting point is that, whereas the great majority of the Redstarts and other species in Britain were in their first winter, a high proportion of those taken at Heligoland were adult; over half, in the case of male Redstarts. It is possible that the adults had tended to depart a little later, but perhaps more likely that young birds are more prone to displacement during migration. The Heligoland fall was not a 'drifted' one, but occurred in light south-west winds with overnight rain.

DEPARTURE AND ONWARD PASSAGE

Although a few of the migrants from the big fall were present up to three weeks later in Suffolk, the majority here and elsewhere moved on very quickly. At Fair Isle some left on the night of the 4th/5th and most of the remainder on the 6th/7th or 7th/8th. More than half of the Garden Warblers which arrived at the Isle of May on the 3rd had gone

next day, and most of the remainder departed on the 4th/5th or 5th/6th. At Spurn two-thirds of the Redstarts seen on the 3rd were no longer present next morning, and most other birds remained no more than one whole day. Similarly, most of the birds appearing at Holme on the 4th moved away very quickly and few were left next morning. At Wey and Blakeney numbers were still high on the 5th, but most had gone by the 6th.

Most of these places offer little suitable habitat for the woodland species and the exodus would be dictated by the scarcity of suitable food, but at least it shows that few of the birds involved were so depleted as to be incapable of rapid onward movement. In Suffolk many of the migrants were reported to be very tired on arrival, and a good many were washed up dead along the tideline after the 'rush'. It may be, however, that wetting by the torrential rain was a more important factor than depletion of fat-reserves, since the very limited data available on the weights of freshly-arrived birds (mainly from Walberswick on the 4th) suggests that few were at unusually low weights. The range for 30 Redstarts there on the 4th was 12.0 to 15.8 grams, average 14.2; for 17 Garden Warblers 16.5 to 22.0, average 18.7; for 16 Pied Flycatchers 11.2 to 14.4, average 13.0; and for seven Willow Warblers 7.9 to 11.5, average 9.3. These are by no means critical weights for these species, though some individuals, such as a Wheatear at 17.0 grams and a Redstart at 10.5 grams at Minsmere early on the 4th, were very light.

Fortunately, there are rich and varied habitats close to the Suffolk coast, and most species would have little difficulty in restoring their reserves. Many birds moved inland from the first arrivals, and from the 4th they were remarkably numerous up to five miles inland, though somewhere does the fall seem to have been at all obvious more than about 10 miles from the coast. Many of the Garden Warblers apparently departed from Suffolk on the clear night of the 4th/5th, but the main departure of most other species took place on the following night, and after this there were further decreases almost daily until only very small numbers remained at mid-month.

In Norfolk the only real reflection of the rush well inland was the occurrence of a few Wrynecks; there were single ones at Thorpe (Norwich), Horstead, Brundall and Old Buckenham on various dates between 6th and 13th. In Suffolk there was some southward shifting along the coast and inland, to areas not affected by the invasion on 3rd, and the common species were encountered in some numbers at many places near the coastline in the southern half of the county between the 4th and the 7th. Fuller details of this southward spread have been given by Axell and Pearson (1966).

In Essex there was evidence of onward movement as early as the

4th, when a Wryneck, two Pied Flycatchers and a Redstart were seen at Bradwell, and an Osprey was there next day. At the Naze some 50 Whinchats were present on the 4th, with a few Wheatears, Redstarts and Pied Flycatchers. A Bluethroat was caught near Hornchurch on the 4th. Apart from these records we have no report of any obvious arrivals after the great fall; there are negative reports from Abberton and Foulness.

A few of the commoner species involved in the falls were seen in the London Parks from about the 6th/7th, but with the possible exception of odd Pied Flycatchers it is not certain that they were linked with the east coast falls; they could equally well have been of British origin. The same applies to some of the movements observed at the southern observatories at this period, though here there are definite links in the arrival of some of the rarer birds.

At Sandwich Bay there were several records of Little Stints, Curlew Sandpipers and Black Terns between the 4th and the 6th, and large numbers of the commoner waders (including 25 Whimbrels) on the 5th. A Wryneck occurred on the 6th, and on the 7th an obvious arrival included some 30 Pied Flycatchers, a Bluethroat, three Siskins, a Tree Pipit and an Osprey. At Dungeness the probable reflections of the great fall included two Wrynecks, a Red-breasted Flycatcher and a Siskin on the 4th, and two Bluethroats, a probable Icterine Warbler and several Pied Flycatchers and Tree Pipits on the 6th. There were Wrynecks each day to the 13th, including three on the 9th, and two more Bluethroats on the 11th.

Beachy Head (Sussex) reported a Barred Warbler on the 4th, two Wrynecks and an Icterine Warbler on the 5th, and a Bluethroat and two Siskins on the 6th, when there were also 20 Tree Pipits. A few Pied Flycatchers were seen on the 4th and 5th, and an Osprey on the 8th, and there were several other Wryneck records from the 7th.

Ospreys were recorded in nearly twenty places in England outside the immediate area of the great fall in the weeks following the arrivals, including individuals as far west as Walney Island (Lancashire) during the 4th-7th and at the Calf of Man from the 6th. Wrynecks were also reported fairly widely, but some may not have had any direct connection with the large influx. They included ones at Walney on the 4th, St. Agnes on many dates from the 3rd, Portland on the 3rd and during the 5th-9th, and St. Catherine's Point (Isle of Wight) on the 4th and 5th, as well as at Bardsey and Skomer later in the month. Very small numbers of Pied Flycatchers seen at Walney on the 5th and at Bardsey, Skokholm and Cape Clear on the 7th might have had some connection.

Evidently the great mass of birds departed without first moving very far from where they had landed, and very few were obliged to descend again within Britain. The observatory at Cap Gris Nez in northern

ance was not manned at this period, and the station at Ouessant off Brittany had no large falls in the period immediately following the partures, though a Wryneck occurred there on the 5th and a small arrival of Pied Flycatchers on the 7th (as in south-west Britain). There was, however, a direct link between the east coast falls and Ouessant, since a Garden Warbler ringed at Redcar (Yorkshire) on 11 September was recovered there on the 15th. It was not part of an obvious arrival of this species, however: only very small numbers were present at Ouessant at this time.

RINGING RECOVERIES

apart from the Garden Warbler already mentioned, 13 birds ringed during the great fall were recovered at some distance from the places of ringing. Two of these showed onward movement within Suffolk: a Redstart and a Pied Flycatcher ringed at Walberswick on 4th September were recovered respectively at Bawdsey (22 miles south-west) on the 11th and at Kesgrave (25 miles south-west) on the 11th. Another Pied Flycatcher had moved on very quickly: it was ringed at Benacre on the 3rd and found on a ship off the coast of south Suffolk or Essex early on the 5th (the vessel was bound from Rostock in East Germany to Houthend-on-Sea).

Three Redstarts ringed in Suffolk during 4th-6th September were recovered abroad later in the autumn: at Logrono (north-east Spain) on 11th September, in Zaragoza province (north-east Spain) about 1st October, and in the Algarve (south Portugal) on 25th October. Another which may have been a 'left-over' from the fall, ringed at Walberswick on 15th September, was recovered at Cordoba in southern Spain about 10th November.) Two more Suffolk Redstarts were reported in 1966: one from Burgos (north Spain) in April, and another from Opland (central Norway) in July. The latter is the first Redstart from an 'early September rush' to be recovered in its home area. Two Pied Flycatchers caught at Benacre on 3rd September were recovered at Cap Ferret (south-west France) on 15th September and in Beira Alta province of Portugal on 18th October; another from Westoft on 4th September was found at Ciboure (south-west France) on the 26th; and one ringed at Bamburgh (Northumberland) on 5th September was in Beira Litoral (Portugal) on 20th October.

Finally, there is an intriguing recovery of a Spotted Flycatcher ringed at Minsmere on 3rd September and recovered at Tivoli near Rome on the 25th. This is only the second recovery of a British-ringed Spotted Flycatcher in Italy, the first having been one caught at the Isle in late August 1960 and found in northern Italy the following October. According to an analysis of ringing recoveries by Creutz (1961), the Swedish population tends to move east or south in autumn

so that these birds were probably from this area. It may be noted that the species has not previously been very prominent among the autumn arrivals on our east coast.

DISCUSSION

There are still several problems connected with 'drift-movements' in the North Sea area which remain unsolved, and which are not likely to be solved merely by the collection and examination of records of arrivals along our coast. It may not be entirely unprofitable, however, to discuss briefly some of the difficulties of interpretation posed by the 1965 falls.

It has been shown by radar observations (Lack 1963, etc.) that the western flank of the great SSW movements out of Scandinavia in autumn regularly traverses south-east England, though in favourable weather conditions the passage may be scarcely detectable by bird-watchers on the ground. The large arrivals of passerine migrants in E. England on 3rd September were presumably due to the obstruction and concentration of this passage at the belt of heavy rain. Lateral drift by easterly cross-winds, together with disorientation and passive down-wind drift in the rainbelt, may be invoked to account for the vastness of the falls. It seems highly improbable that Scandinavian migrants regularly cross East Anglia in such density; most of the birds involved would have been deflected west of their 'normal' route.

The waders involved in these movements seem to fall essentially into the same category as the SSW-oriented passerines, though some must evidently have originated further east than these, and some were not halted at the coast but penetrated further in the zone of bad weather (e.g. to the London reservoirs) on the 3rd. A high-flying SW-oriented stream of waders was recognised by the radar workers as a regular feature of early autumn over the North Sea and eastern England. Small numbers of northern waders have been associated with each of the earlier 'September rushes' and, although these birds were exceptionally numerous in Suffolk in 1965, it is not clear that waders were relatively more abundant than might have been expected in such a stupendous fall.

The not insignificant arrivals of passerines in Scotland during the 2nd-4th are more puzzling, since they apparently occurred under clear or partially clear skies and with rather light easterlies in the northern part of the North Sea; and the east wind zone did not extend sufficiently far north in Scandinavia to occasion a simple lateral displacement of over 200 miles at the latitude of Fair Isle in migrants oriented SSW, even had their journey started in northern Scandinavia. The situation in this respect is similar to that in early September 1958 (Williamson 1959), unless the weather maps on both occasions are highly misleading.

Another problem is the simultaneous arrival at stations all along our east coast of common migrants which may be presumed to have the SW orientation and of other species which certainly do not. The Terpine and Barred Warblers, Lesser Whitethroats and Red-backed Thrushes, which were very widespread, and also the few Red-breasted Flycatchers, the Greenish Warbler and some others, belong to species of which the entire European population migrates to east or south in autumn. Moreover, the 'migratory divide' for a few of the commoner species lies within Scandinavia and (as the Italian Spotted Flycatcher recovery from Minsmere suggests) some elements of the SSE-oriented populations of these species were almost certainly involved. This would be particularly likely with the Wren and Bluethroat, in which a relatively small part of the north European populations lies west of the migratory divide.

Williamson (1959) first formulated in detail the hypothesis that these SSE-oriented migrants reach Britain during a post-breeding dispersal, mainly of juveniles, in the period between breeding and true migration. He suggested that this dispersal was at random, not oriented in any preferred direction; but Nisbet (1962) postulated that in the case of the Barred Warbler and the Red-breasted Flycatcher the pre-migratory movements are oriented north-west, in the opposite direction to that of the true autumn migration (and in the same direction as the spring movements). Both agreed that such movements were favoured by anticyclonic (i.e. fine) weather, and by favourable winds in the North Sea area when they were prolonged across it; but Nisbet also found a more marked correlation between the distant movements and high temperatures in the breeding area of the two species with which he was most concerned. Williamson (1963) carried his arguments further by postulating that some of the commoner species may also cross the North Sea during dispersive rather than truly migratory movements. He also suggested that the dispersive element might be more in evidence 'a year of high fertility' and that 'under favourable weather-conditions both oriented migration and random dispersal will go on side by side'. He visualised the dispersive elements as 'wandering aimlessly at random within the anticyclonic system'.

There is now a substantial body of evidence from ringing in Britain and Europe that post-breeding dispersal in 'wrong' directions does occur, mainly among juveniles; and, though much of it awaits detailed examination, or is still insufficient for specific analysis, the indications for several common migratory species are that the dispersal is at random over the relatively short distances involved in most recoveries. This is true of British Swallows (Davis 1965) among others. There is, however, some evidence from the ringing of *Sylvia* warblers, notably Blackcaps *S. atricapilla* and Garden Warblers, that the more distant

movements in 'wrong' directions are directly opposed to the standard direction of migration; these recoveries are discussed in a forthcoming paper on *Sylvia* migration-seasons (Davis in preparation). What is apparently 'reversed migration' has also been documented for the Yellow-breasted Chat *Icteria virens* of North America (references in Nisbet 1962), and Dr. K. B. Rooke (*in litt.*, and in preparation) has pointed out that the European records of Pallas's Warbler *Phylloscopus proregulus* are distributed very close to the Great Circles which also link its north Asian breeding-area and its south-east Asian wintering area, so that here also the autumn dispersal appears to be in a direction directly opposed to that of normal migration.

On the other hand, there are two Garden Warbler recoveries from Swedish ringing which lend credence to the hypothesis of Williamson; both were ringed as juveniles in July and recovered due west in Norway, up to 100 miles away, by the end of August. Such a movement, if prolonged in favourable weather, could have brought them to Fair Isle. This was plainly not reversed migration, since ringing recoveries show that the Garden Warblers from the whole of Europe (with the doubtful exception of the extreme south-east) move west of south in autumn (Mayaud 1961, Davis in preparation). In my opinion, both the 'random dispersal' and the 'reversed migration' hypotheses may be necessary to the eventual unravelling of the mysteries of bird movements in the North Sea area, especially those in the northern part. Evidence that some birds could be moving west and south-west as well as SSW out of Scandinavia would help to explain the 1965 arrivals of the commoner species in the North Isles, which cannot be accounted for by lateral drift of SSW-oriented migration, and which should not have been totally disoriented in clear weather; the birds involved must have moved downwind over the sea. Random dispersal, or pre-migratory movement oriented west or south-west, could also explain the presence of discordant elements (like the SSE-oriented Spotted Flycatcher) further south along the English coast.

It would still be rather surprising that so many Barred Warblers and Red-backed Shrikes, and odd Red-breasted Flycatchers, were involved in these falls. All are rather scarce as breeding birds in Scandinavia, and the weather in Germany was most unsettled at this time. Perhaps there had been an earlier dispersal or 'reversed migration' into Scandinavia (certainly a good many Barred Warblers had reached Britain as usual during August), which was resumed with the establishment of the anticyclone there. Nisbet (1962) was prepared to envisage that some Barred Warblers might resume movement in directions other than north-west or south-east after the pre-migratory flight, and indeed the distribution and timing of the British records shows that this must occur (Davis in preparation).



PLATE 58. Adult Black-browed Albatross *Diomedea melanophris*. Note the short, thick neck. The white body and rump, grey tail, and grey mantle between sooty-brown wings are typical of the 'mollymawks' (pages 376-384) (photo: John Warham)



PLATE 59. Adult Black-browed Albatross *Diomedea melanophrys* from below. The under-wings are broadly margined with blackish along the anterior edge and rather narrowly so along the posterior edge; the strip of white down the centre is less sharply defined, or sometimes even absent, in immature birds (photo: John Warham)

PLATE 60. Under-wings of Black-browed (upper) and Grey-headed Albatrosses *Diomedea melanophris* and *chrysostoma*, adults on left and immatures on right, to show age variation and the similarity between the species. These immatures may vary individually, and *melanophris* can be darker and *chrysostoma* lighter than in the examples shown (photo: Dept. of Photography, British Museum, Natural History)





PLATE 61. Adult Grey-headed Albatross *Diomedea chrysostoma* with under-wing as Black-browed, but head blue-grey with white behind the eye (photo: John Warham). Below, adult Yellow-nosed Albatrosses *D. chlororhynchos* with yellow-ridged black beak and sharp black edges to under-wing (photos: R.N.B.W.S. and Patrice Paulian)





PLATE 62. Immature Yellow-nosed Albatross *Diomedea chlororhynchos* with the bill starting to lighten along the ridge; note the characteristic albatross shape on water (photo: T. N. Serrenty). Below, adult Shy Albatross *D. cauta* showing the deep-based bill and narrow black edges to the under-wing (photo: Patrice Paulian)





PLATE 63. Immature Wandering Albatross *Diomedea exulans*; note the short tail. The fact that this bird still has dark tips to the tail-feathers excludes the possibility of a Royal Albatross *D. epomophora* (which likewise has a white body and, in the race *sanfordi*, similarly dark-based upper-wings) (photo: R.N.B.W.S.)



PLATE 64. Near-adult Wandering Albatross *Diomedea exulans* with brown suffusion in breast, black in tail and under-wing typical of both the 'great' albatrosses (photo: John Warham). Below, adult showing the heavy pale bill; some, females especially, have brown flecks on the crown (photo: N.S.W. Albatross Study Group)





PLATE 65. Adult Light-mantled Sooty Albatross *Phoebastria palpebrata* with the silhouette typical of this genus; note the dark bill with the blue groove and the white crescent behind the eye. Below, Giant Petrel *Macronectes giganteus*, which is albatross-sized but with stumpier body and shorter wings (photos: John Warham)



There would remain the wider problem of why birds disperse in early autumn and, in particular, why they may disperse over such great distances in 'wrong' directions. Short-distance dispersal may be seen to be advantageous (e.g. by relieving population-pressures at the time when they are greatest) and since it mainly concerns juveniles it should be strongest in years of high post-fledging survival. It is much more difficult to envisage that dispersal over long distances, involving long sea-crossings and experience of unfamiliar habitats and climatic conditions, can have any adaptive value. It seems, for example, that the warblers which reach Fair Isle have a low rate of survival, since only one (a Blackcap) of over 3,000 ringed there has so far been recovered at any distance from the island, a proportion far below the national recovery rate for this group of birds. Probably the longer movements are simply an extension of the 'normal' short-distance dispersal, induced by the particular weather situation associated with them by Williamson and Nisbet, and analogous with the well-documented phenomenon of overshooting in fine warm weather in spring. Only a very small part of the population would be concerned in the longer movements, and its fate would have little bearing on the welfare of the species as a whole.

An alternative hypothesis, that some birds are deficient in the power to orientate in the standard direction of migration and depart in wrong directions on migration, might meet some of the observations made on the east coast in autumn, but there are now enough recoveries (e.g. of Robins) ringed at east coast observatories and subsequently recovered at: to the south-east to show that this hypothesis would not have general application. It is not clear, however, that any bird displaced at: to the west of its home area in early autumn can correct for this displacement, or whether a subsequent oriented movement is parallel to the 'normal' route.

Finally, in connection with the great strength of the 1965 arrivals, it should be mentioned that several events in Britain later in the autumn might carry the implication that the breeding-season had been an uncommonly productive one in northern Europe. Further very large arrivals of passage-migrants occurred in late September and early October, the Ring Ouzel in particular being several times more numerous than in any other recorded year. Fieldfares and Goldcrests *Regulus regulus* were particularly abundant, and the former arrived very early in quantity, as did the winter Blackbirds *Turdus merula*. An invasion of Waxwings *Bombus garrulus* was the largest on record, and it began very early; while several other irruptive species appeared in considerable numbers.

Enquiries directed to correspondents in Norway and Sweden have not, however, yielded any confirmatory evidence. Dr. K. Curry-

Lindahl informs me that in north Sweden it was a late spring and several species appeared to have had poor breeding-success, some (including the Ring Ouzel) finding their habitat snow-covered long after the normal time; only the Waxwing and a few other birds of coniferous forest seemed to have bred at all successfully. Dr. H. Holgersen tells a very similar story, his wide correspondence in western Norway suggesting that most species fared badly in a very inclement season; a correspondent of his in south Sweden asserted that the summer there was 'just a continuation of the previous winter'. Thus, although there is no more than subjective evidence, it can be inferred that the population of young birds in Scandinavia in late summer was by no means exceptionally high. This serves to emphasise the fortuitous nature of falls of migrants on our east coast in autumn, showing that the weather at the time of the autumn movements is a much more important factor than the actual strength of the bird-populations involved.

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SUMMARY

A fall of north European summer migrants on the east-facing coast of Suffolk and Norfolk on 3rd September 1965 was by far the largest of its kind ever recorded in Britain. Considerable numbers of migrants also appeared further north along the east coast about the same time, and large arrivals were reported from Vlieland (Netherlands) and Heligoland (Germany). The most abundant of the birds concerned were Wheatears *Oenanthe oenanthe*, Whinchats *Saxicola rubetra*, Redstarts *Phoenicurus phoenicurus*, Garden Warblers *Sylvia borin*, Willow Warblers *Phylloscopus trochilus* and Pied Flycatchers *Ficedula hypoleuca*; but over 70 others were also involved. Wrynecks *Jynx torquilla* and Bluethroats *Luscinia svecica* were exceptionally numerous.

The falls are described in this paper and related to the weather pattern. Ringing recoveries and weights are mentioned. Evidently most of the birds were part of the SSW-oriented stream from Scandinavia to Iberia, disoriented, concentrated and forced down by a belt of overcast and heavy rain.

Some anomalies are discussed. The falls in north Scotland appear not to be explicable on the basis of simple lateral deflection by cross-winds of SSW-oriented migration; the arrivals everywhere included a number of species (such as the Barred

arbler *Sylvia nisoria* and the Red-backed Shrike *Lanius collurio*) whose autumn migration is known to be oriented about SSE; and some of the commoner species in t England may have included members of SSE-oriented populations (a Suffolk-ged Spotted Flycatcher *Muscicapa striata* was recovered in Italy). These anomalies ould be explicable with the confirmation of the 'random dispersal' theory of lliamson (1959) or of the 'reversed migration' hypothesis of Nisbet (1962), but n evidence is still lacking.

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Appendix. Scientific names of species

Grey Buzzard <i>Pernis apivorus</i>	Little Gull <i>Larus minutus</i>
Grey Pandion <i>Pandion haliaetus</i>	Black Tern <i>Cblidonias niger</i>
Ringwing <i>Vanellus vanellus</i>	Common Tern <i>Sterna hirundo</i>
Ringed Plover <i>Charadrius hiaticula</i>	Cuckoo <i>Cuculus canorus</i>
Ringed Plover <i>Charadrius dubius</i>	Wryneck <i>Jynx torquilla</i>
Ringed Plover <i>Charadrius alexandrinus</i>	Fieldfare <i>Turdus pilaris</i>
Ring Plover <i>Pluvialis squatarola</i>	Redwing <i>Turdus iliacus</i>
Ring Plover <i>Pluvialis apricaria</i>	Ring Ouzel <i>Turdus torquatus</i>
Ring Plover <i>Pluvialis apricaria</i>	Whatear <i>Oenanthe oenanthe</i>
Ring Plover <i>Pluvialis apricaria</i>	Whinchat <i>Saxicola rubetra</i>
Ring Plover <i>Pluvialis apricaria</i>	Redstart <i>Phoenicurus phoenicurus</i>
Ring Plover <i>Pluvialis apricaria</i>	Bluethroat <i>Luscinia svecica</i>
Ring Plover <i>Pluvialis apricaria</i>	Robin <i>Eritacus rubecula</i>
Ring Plover <i>Pluvialis apricaria</i>	Grasshopper Warbler <i>Locustella naevia</i>
Ring Plover <i>Pluvialis apricaria</i>	Great Reed Warbler <i>Acrocephalus arundinaceus</i>
Ring Plover <i>Pluvialis apricaria</i>	Sedge Warbler <i>Acrocephalus schoenobaenus</i>
Ring Plover <i>Pluvialis apricaria</i>	Aquatic Warbler <i>Acrocephalus paludicola</i>
Ring Plover <i>Pluvialis apricaria</i>	Icterine Warbler <i>Hippolais icterina</i>
Ring Plover <i>Pluvialis apricaria</i>	Barred Warbler <i>Sylvia nisoria</i>
Ring Plover <i>Pluvialis apricaria</i>	Garden Warbler <i>Sylvia borin</i>
Ring Plover <i>Pluvialis apricaria</i>	Whitethroat <i>Sylvia communis</i>
Ring Plover <i>Pluvialis apricaria</i>	Lesser Whitethroat <i>Sylvia curruca</i>
Ring Plover <i>Pluvialis apricaria</i>	Willow Warbler <i>Phylloscopus trochilus</i>

Greenish Warbler <i>Phylloscopus trochiloides</i>	Tawny Pipit <i>Anthus campestris</i>
Chiffchaff <i>Phylloscopus collybita</i>	Tree Pipit <i>Anthus trivialis</i>
Wood Warbler <i>Phylloscopus sibilatrix</i>	Red-backed Shrike <i>Lanius collurio</i>
Spotted Flycatcher <i>Muscicapa striata</i>	Siskin <i>Carduelis spinus</i>
Pied Flycatcher <i>Ficedula hypoleuca</i>	Chaffinch <i>Fringilla coelebs</i>
Red-breasted Flycatcher <i>Ficedula parva</i>	Ortolan Bunting <i>Emberiza hortulana</i>

Albatross identification in the north Atlantic

By John Warham, W. R. P. Bourne and H. F. I. Elliott

(Plates 58-65)

INTRODUCTION

MOST TEXTBOOK DESCRIPTIONS of albatrosses are based on the study of skins in museums and concentrate on useful characters for identifying birds in the hand, such as measurements and the bill characters illustrated on page 493 of Murphy (1936). As the growing interest in watching birds at sea produces more frequent reports of albatrosses in our area, especially young ones in difficult plumages, characters which are more easily distinguished at a distance are tending to assume greater importance and these need to be properly understood if the birds are to be identified from brief glimpses. It therefore seems timely to attempt to clarify and summarise the available information on the field-characters of the albatross species which are known or likely to visit the North Atlantic. Further information, with accounts of the other species, will be found in Alexander (1955), Moreland (1957), Murphy (1936) and Palmer (1962), and in the references cited by the last two. Elsewhere (*Ibis* in press) Bourne will be presenting a fuller discussion of long-distance vagrancy in the Procellariiformes and reviewing all records.

On present information, the albatrosses which require most serious consideration in the North Atlantic are the Black-browed *Diomedea melanophrys* (six specimen records in the north and east), the Yellow-nosed *D. chlororhynchos* (three specimen records in the south and west), the Shy *D. cauta* (one specimen record in the North Pacific) and the Grey-headed *D. chrysostoma* (several specimens in both oceans, but of doubtful origin). These are all very similar, medium-sized species known as 'mollymawks' in the southern hemisphere where they breed. For completeness we are also including the two 'great' albatrosses, the Wandering *D. exulans* (one specimen record in the Mediterranean) and

the Royal *D. epomophora* (one very doubtful record in Morocco); the two 'phoebetria' albatrosses, the Sooty *Phoebetria fusca* and the Light-mantled Sooty or Grey-mantled *P. palpebrata* (neither recorded with any certainty and, although the former is more likely, the only records are based on the misidentification of *palpebrata* specimens of doubtful origin); and the albatross-sized Giant Petrel *Macronectes giganteus* (seen in the North Pacific). Other species are very unlikely indeed.

GENERAL CHARACTERS

Albatrosses in flight may be readily recognised by their large size, all being appreciably larger than a Gannet *Sula bassana* (wingspan 5 feet 6 inches). The combination of very long, narrow wings with a powerful gliding flight is also distinctive. In a wind the wings are held stiffly and are beaten only occasionally without normally being raised above the level of the body, though they are flexed at the carpal joints and twisted to take advantage of air currents. In gales they may be flung back steeply from the carpal joint. In calms or fog albatrosses often settle on the sea where they ride very buoyantly and appear much larger than Gannets or Great Black-backed Gulls *Larus marinus* near-by.

The species known to have reached the North Atlantic or likely to do so unaided can be divided into three groups according to the colour of their upper-parts. Of these it is the mollymawks in group A which pose the real problems of identification, while the members of groups B and C are less likely to be met and will usually be easily told apart:

- A. Large, wingspan 6-8 feet, with the body white but the upper-wing and mantle wholly dark, making a complete dark band from wing-tip to wing-tip like a Great Black-backed Gull, but with a white rump and dark tail (Black-browed, Yellow-nosed, Shy and Grey-headed Albatrosses, or mollymawks).
- B. Extremely large, wingspan about $9\frac{1}{2}$ feet, and relatively long in the wing but short in the tail, with dark extremities to the upper-wing which do not meet across the white body, or, if they do, with much dark on the body as well (Wandering and Royal, or 'great', Albatrosses).
- C. Large, wingspan about $6\frac{1}{2}$ feet, with wings and body brown to grey-brown both above and below (Sooty and Light-mantled Sooty, or 'phoebetria', Albatrosses and dark phase Giant Petrel).

GROUP A: THE MOLLYMAWKs

The identification of mollymawks is complicated by our incomplete knowledge of the sequence and characters of the immature plumages. Unfortunately it is the immatures which are seen most often in our

area, although adults also appear, and most of those collected have been nearly or entirely adult by the time they came to grief. Members of the group are easily recognised by the dark back and tail, though the latter may be inconspicuous against the dark sea and is often omitted from descriptions. Adults usually have bright, contrasting bill markings and pure colours on the head and back which vary in shade with the species, while young birds are usually drabber with less well-defined markings. The following are the critical details to look for:

- (a) The amount and distribution of white on the under-wing, its width, and whether it is clearly demarcated from the dark wing margins.
- (b) The general and, if possible, the detailed colour of the bill, and its shape in relation to the head.
- (c) The amount of grey on the head or nape, if any; the extent of the dark patch round the eye and whether this confers a 'beetling' aspect to the brows; and the presence or absence of a white mark just behind and below the eye.
- (d) In adults at close quarters, the colour of the mantle.
- (e) Once comparative experience has been gained, the shape and build of the bird.

Of these five key points, (a) is probably the most important, since it is the most likely to be visible at a distance, though a study of fresh and relaxed museum material and of photographs suggests that much allowance must be made for age and individual variation and the effect of light and angle of view. However, it should enable the bird to be assigned to one of three groups:

- (1) Under-wing with a white central area not very clearly marked off from the dark tips, and dark margins which are quite broad anteriorly but narrower posteriorly; some immatures have little more than a pale central area which may be hard to see in shadow (Black-browed and Grey-headed Albatrosses).
- (2) Under-wing with a large central area of white sharply marked off from a dark tip and well-defined dark margins which are a little wider in front than behind (Yellow-nosed Albatross).
- (3) Under-wing wholly white except for a black tip and very narrow black margins (Shy Albatross).

Black-browed and Grey-headed Albatrosses

These share much the same nesting islands in the far south, but, whereas the Grey-headed tends merely to disperse at sea in the same latitudes in winter, the Black-browed migrates north strongly to feed over the southern continental shelves. It follows that we are much more likely to see the latter than the former; indeed, none of the northern records of the Grey-headed Albatross stands up to detailed scrutiny. Should

Grey-headed occur, the adults of the two species are readily separable under ordinary viewing conditions, but the youngest immatures are not and present the most important cause of doubt in the identification of recent descriptions, often resolvable only by the consideration of geographical probabilities, since Grey-headed Albatrosses are very unlikely in the north.

Unfortunately there are few specimens of the critical age-group in museums, because fully-feathered fledglings have seldom been collected. The most useful sources of information we have traced are a report of beached birds in South Australia by Condon (1936) and an account of observations in the Antarctic by Falla (1937), which we have supplemented by examining series of skins in the Canterbury Museum, New Zealand, and the British Museum (Natural History), where Graham Cowles has also relaxed some wings to show the under-sides (plate 60).

It appears that in their first plumage both species are grey above, including the crown and hind-neck, with the bill more or less dark, the under-parts white, and the under-wing pale in the centre with a dark tip and broad, dark margins. The Black-browed Albatross tends to be greyer with slightly more contrast, and the Grey-headed browner above, but the difference is not great and there is a good deal of individual variation. Condon reported that the young Grey-headed is more and darker grey on the head than the young Black-browed; skins confirm this and also suggest that the Grey-headed always has the head uniformly dark except on the ridge, whereas the young Black-browed has it greyish-horn with a darker tip. It is debatable to what extent these things could be distinguished at sea, but see figs. 1 and 2. After the first year the two species diverge progressively in appearance. The head of the Black-browed becomes white and the bill progressively yellower from the base, while the head of the Grey-headed remains grey and the bill stays black but develops a yellow margin above and below. Both now begin to show a distinct white centre to the under-wing. The characters of the mollymawks may therefore be summarised as follows.

Black-browed Albatross (plates 58-60)

This is one of the larger mollymawks, with a wingspan of just over 7 feet and a short, thick neck that gives the bird a humped look. The back of the adult is a slightly darker grey than in most other species, *the under-wing has a small to quite large white central stripe with broad and somewhat ill-defined brownish-black margins*, wider in front, the white tending to merge with the margins most towards the wing-tip. *The head is wholly white* except for a dark patch before, above and behind the eye socket, present to a varying extent in most mollymawks, but tend-



FIG. 1. Head of immature Black-browed Albatross *Diomedea melanophris*. The feathers are white dusted with greyish at their ends above and on the shoulders, creating a rather nondescript mottled effect which wears to white as the feather ends fade and are lost. The bill has brownish-horn lateral plates with a blackish-brown nail (photo: John Warham)

ing to give this species a 'frowning' look. The bill is yellow or orange-yellow with a pink tip; it is swollen at the base and tapers towards the tip, so that it does not appear disproportionate compared to the head.

Immatures are duller and drabber, with the top of the head and neck grey at first, though this soon wears, fades or is moulted to white, according to Miss M. Courteney-Latimer leaving the lower neck bluish-grey. The under-wing at first has little white which tends to merge with the dark tips and margins, though the central white stripe soon becomes prominent. The bill is blackish-grey, soon developing horn-coloured patches on the lateral plates, and the tip is darker. As the bird matures, the base becomes yellow and in most sub-adults seen at sea the bill is yellow with a dark tip, the last sign of immaturity. The shape of the bird and its bill should be distinctive at any age.

Grey-beaded Albatross (plates 60-61a)

This is a medium-sized mollymawk of average build with a wingspan



FIG. 2. Head of immature Grey-headed Albatross *Diomedea chrysostoma*. The entire head and throat is solid grey, almost bluish; this is sharply separated from the white of the upper breast (just visible here) and does not get paler with time. The bill is dark horny grey-brown all over, with the ramicorn a little browner and the centre of the ridge of the culmen mottled pale horn for the proximal two centimetres. A faint light crescent behind the eye may be more prominent in life (photo: John Warham)

of about 7 feet. The back is a slightly paler grey than in the Black-browed. In some adults seen in life the under-wing resembled that of many black-broweds, with a broad central area of white, not too sharply marked off from brownish-black margins which were broader along the leading edge outward of the carpal joint, and narrower along the trailing edge. However, R. O. Morris tells us that he thinks that the white is normally more extensive with less well-defined margins and extends further back behind the central axis of the wing than in the Black-browed. The head, nape and face are grey, with a white mark just below and behind the eye which can often be seen at close range even in birds in flight. There are dark feathers in the eye socket, but these do not confer a frowning aspect. The bill is glossy black, broadly edged above and below with orange or yellow, and tipped with orange-pink.

The immature has the head a darker grey than in the Black-browed according to Condon in Australia, though W. L. N. Tickell considers the tone

lighter than in the adult, while A. Y. Norris states that the whole head appears brownish-grey to dull grey where it meets and is sharply differentiated from the white on the throat and breast, in which respect it is quite distinct from some young Black-browed, in which the grey blends with the white. *The bill is grey-black* and comparatively short, becoming narrowly horn-coloured and then yellowish above and below as the bird matures. In skins *the under-wing is very like that of the young Black-browed*; Condon reported that in beached birds it appeared *dark with a narrow central white band*.

Yellow-nosed Albatross (plates 61b-62a)

This is a rather small, lightly-built mollymawk with a wingspan of $6-6\frac{3}{4}$ feet. In adults *the head is very pale grey, looking white at a distance*, and the dark feathers round the eye usually give the appearance of a small triangular patch pointing downwards. The mantle is of about the same shade as that of the Black-browed Albatross. *The under-wing has much more white than that of either of the previous two species*, though there is still a fairly broad dark anterior margin. *The bill is black with a ye low stripe along the ridge of the upper mandible* and a pinkish tip; it has a narrow base and broad tip with relatively little taper, and Warham thinks that it looks rather long and gives the head a top-heavy appearance (plate 62a).

Immatures are very similar, with a pure white head and black bill, which is quite slender at first, but becomes more massive with a horn and then yellow line on the ridge as the bird matures.

Shy Albatross (plate 62b)

This is the largest of the mollymawks, and is rather thick-bodied and broad-winged, with a wingspan of 8 feet. It has a *grey head, and in the southern adults a white crown* contrasting with the shading in the eye-socket; hence the Australian name 'White-capped Albatross'. The mantle is medium grey, much like that of the Grey-headed, and *the distinctive under-wing entirely white* except for very narrow dark margins and a black tip. *The bill is deep at the base with pale blue-grey lateral plates running up in front of the eye and set off by a dark line extending down and back in a horseshoe behind the nostrils*. In the adult there is a yellow line above and below shading into orange at the tip, but young birds may have the whole bill grey or olive. Otherwise, apparently, *immatures are much like adults*.

GROUP B: THE 'GREAT' ALBATROSSES

These birds can hardly be mistaken for anything else, *with a wingspan of 9-10 feet and short tails which give them a 'stumpy' look; a characteristic white under-wing with a dark tip and narrow trailing edge; and a massive pink bill*. The birds most likely to appear in the northern hemisphere, young

andering Albatrosses, have a *distinctive juvenile plumage*. Older wandering Albatrosses are hard to tell from the typical race of the Royal Albatross, *which however has a narrow dark cutting edge to the upper mandible*.

Wandering Albatross (plates 63-64)

In the southern populations the extreme form of *adult is wholly white except for dark ends to the wings* and a dark line along the rear margin of the under-wings. *The massive bill is very pale flesh, almost white*. On edging, *immatures have brown bodies and upper-wings, but their faces are white, and their bills and under-wings as in the adult*. With increasing age, *the brown of the body is gradually replaced by white* and the basal region of the upper-wing becomes paler, until finally there is only a dark patch on the breast and dark feathers in the tail. The northern populations begin to breed before all traces of the immature plumage have been lost, and *while immature feathers remain they are instantly recognisable as Wandering Albatrosses as the Royal has no immature plumage*.

Royal Albatross

This species resembles extreme adult Wandering Albatrosses *at all points except for the black cutting edge of the upper mandible*. However, the northern race *saufordi* has an almost entirely dark upper-wing and a white body, a combination not found in the Wandering Albatross, so confusion may be avoided there. The species breeds in lower latitudes than the Wandering Albatross and appears to migrate east and west while the other moves north and south, so that it is comparatively unlikely to turn up north of the Equator, but it should be borne in mind.

GROUP C: THE 'PHOEBETRIA' ALBATROSSES AND THE GIANT PETREL

The very southerly Light-mantled Sooty Albatross has a range like that of the Grey-headed, and several northern records are untenable. Its northern representative, the Sooty Albatross, has a range like that of the Yellow-nosed and seems about equally likely to occur north of the Equator, though it has not been recorded yet except in error for the Light-mantled Sooty. If it did occur there would be a strong possibility of confusion with the young of the Giant Petrel, a species which breeds in the south and migrates north strongly, so that it is also likely to cross the Equator sooner or later in the Atlantic as well as the Pacific. 'Phoebetria' albatrosses have *long, cigar-shaped bodies* which appear pointed at both ends because the wedge-shaped tail is normally held closed. They are the most graceful and competent of all albatrosses in the wing. The Sooty Albatross is *dark brown all over, with the head*

darker still, though the wing feathers are glossy so that the dark underwing may reflect light as the bird banks away from an observer with the light behind him. *The bill is glossy black with a yellow groove along the lower mandible* and an incomplete white ring round the eye is prominent at close quarters. The Light-mantled Sooty Albatross (plate 65a) is *similar with a grey back and a blue, not yellow, groove in the lower mandible*. The young Sooty has a dark bill and may be paler on the back, while the young Light-mantled Sooty may be darker; indeed, Learmonth (1960) reported that *it may be impossible to tell immatures of the two species apart even in the hand*.

The possibility of the occurrence of the Giant Petrel (plate 65b), *a huge fulmar the size of an albatross with a fan-shaped tail and a distinctive massive pale bill*, has only to be considered to prevent confusion. Apart from an all-white phase in the far south, adults are grey-brown with paler heads, while *the immatures which migrate north are dark brown* and could be mistaken for Sooty Albatrosses.

ACKNOWLEDGEMENTS

We are most grateful for help with information or photographs from Miss M. Courteney-Latimer, R. H. Green, R. O. Morris, A. Y. Norris, Patrice Paulian, D. L. Serventy, V. N. Serventy, W. L. N. Tickell, the New South Wales Albatross Study Group, and the Royal Naval Bird Watching Society. We should like to thank the officers of the Canterbury Museum, New Zealand, and of the Bird Room at the British Museum (Natural History) for facilities for studying the albatross material in their care, and most especially Graham Cowles, who relaxed wings to show the pattern of the under-sides.

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Notes

Moorhen attacking Stoat in water.—At about 10.45 a.m. on 24th July 1966, at Clapgate, near Wimborne, Dorset, I was watching a Moorhen *Gallinula chloropus* with a brood of five young swimming and foraging for food in the reeds at the side of the river. Suddenly I saw a small creature about ten inches long slip into the river some six yards downstream from the Moorhen family and begin to swim across. The Moorhen and its young immediately swam towards it and, as they got nearer, it turned towards them and I could see the characteristic, long, black-tipped tail of a Stoat *Mustela erminea*. The adult Moorhen threw herself at the intruder and, landing with a splash right on top of it, caused it to dive. Meanwhile, the young were calling loudly and flapping their wings only a few feet away. The Stoat surfaced after about 20 seconds and was immediately chased again by the Moorhen. Swimming frantically towards the opposite side of the river, it scrambled up the bank and away, while the Moorhen and its brood returned to the reeds.

B. J. FRAMPTON

Arctic Skua chasing Little Egrets.—On 21st August 1966, near Port Louis, in the Rhône delta, France, we were watching an Arctic Skua *Stercorarius parasiticus* unsuccessfully pursuing some Herring Gulls *Larus argentatus* when two Little Egrets *Egretta garzetta* which had been among the gulls on the ground took flight. As they reached the same altitude as the skua and a Herring Gull, the skua ceased attacking the latter and began diving repeatedly at the heads of the egrets, presumably in an effort to make them disgorge food. The egrets responded by spiralling upwards with agitated wing-beats much faster than normal, trying to escape by gaining height, but the more agile skua was easily able to keep up and continued its attacks for several minutes more. These were unsuccessful, however, and it eventually broke off to chase the gulls again.

I. MCPHERSON, R. GOMES and R. E. JONES

Blackbird laying clutch of eggs on bare earth.—On 21st May 1966 I noticed a female Blackbird *Turdus merula* sitting on a flower-bed close to the front of our house at Isfield, near Uckfield, Sussex. I thought that she had probably hurt herself by flying into the telephone wire above, but when I bent down to look more closely she flew away and I found that she had been sitting on four eggs. These had been laid on the bare earth, some six inches from the wall of the house, without proper scrape or hollow, let alone any attempt at nest-lining. I put up a small fence of wire netting around the eggs and the bird continued to sit for several days on three of them, the fourth having been pushed

on one side. During this time I watched her brooding on many occasions, and so did a number of my friends and neighbours. After about a week she began to leave the eggs for longer periods and finally abandoned them altogether. At no time was a male in evidence at the 'nest' and there seemed to be no connection between this solitary female and two other pairs of Blackbirds nesting within ten yards, one in a young fir tree and the other in a climbing rose; our garden of two-thirds of an acre contains many young trees and backs on to agricultural land.

H. F. TAYLER

Reviews

Pesticides in the Environment and their Effects on Wildlife: the Proceedings of an Advanced Study Institute sponsored by the North Atlantic Treaty Organisation, Monks Wood Experimental Station, England, 1-14 July 1965. Edited by N. W. Moore. Journal of Applied Ecology, supplement to volume 3, June 1966. 311 pages. 70s.

Dr. N. W. Moore is to be congratulated not only on the marathon task of editing this symposium volume and getting it published in less than a year, but also on his able directorship of the Advanced Study Institute. The North Atlantic Treaty Organisation generously sponsored the Institute which was held from 1st to 14th July 1965 at Monks Wood Experimental Station, the base of the Nature Conservancy's Toxic Chemicals and Wildlife Section.

The symposium was planned primarily for scientists of different disciplines to get together. Most were from government agencies and universities; their task was to discuss basic information about pesticides and their use, and wildlife populations and the effects of pesticides on them. There was thus a remarkable gathering of toxicologists, chemists, ecologists and others from many countries.

A total of 34 invited papers was presented from the 72 participants; and, among the 24 papers concerned with research projects, 18 dealt primarily with birds. An adequate outline of so many papers is impossible in a short review, so that the following can provide only the briefest summary of their scope and extent.

Following a review of the value of pesticides and a quantitative assessment of their use in Great Britain, the results are discussed of their effects on wildlife in Switzerland, the Netherlands and California, on salmonid fish, freshwater pond life, reproduction of Herring Gulls *Larus argentatus*, populations of American White Pelicans *Pelecanus erythrorhynchos*, inter-actions of effects on plants and animals, breeding success of Ospreys *Pandion haliaetus*, populations of various

birds near the ends of food chains (Heron *Ardea cinerea*, Great Crested Grebe *Podiceps cristatus* and birds of prey), breeding Pheasants *Phasianus colchicus*, Hares *Lepus timidus*, forest birds (phosphamidon) and House sparrows *Passer domesticus* (DDT), and reproduction of Red-legged partridges *Alectoris rufa* (thiram).

Work on residues and on their effects or distribution in various ecosystems or areas is described, for example from Lake Michigan and Antarctica, in British birds (DDT) and in an estuarine environment. The work of various committees and organisations is also discussed, notably that of I.U.C.N.'s Committee on the Ecological Effects of Chemical Controls, the British Pesticides Safety Scheme and a special committee set up in France to investigate the effects of pesticide treatment. Among other topics covered are the effects of pesticides on non-target organisms in the course of vector control; 'integrated control' and possible future patterns of pest control; contaminated invertebrates and their risk to birds; toxicity of various pesticides to game-birds; behavioural changes due to pesticide contamination; the need for an international monitoring system; the use of isotopes in establishing the translocation of pesticides; and methods of studying the effects of pesticides on birds in the absence of analytical facilities.

This valuable series of papers emphasises the importance and complexity of the global scale of pesticide/wildlife problems. Dr. Moore completes the main text of the volume with a masterly assessment of the discussions which took place at the symposium. Of particular importance here is his emphasis on gaps in our knowledge and on unresolved problems. He also stresses the need for information on long-term population trends. Readers will find this section of immense help in putting the pesticide/wildlife problem in proper perspective. In this respect we should be careful not to overlook other factors, such as marsh-draining and hedgerow destruction, to name only two, which can effect bird populations and distribution.

A general statement by the participants of the Advanced Study Institute appears in an appendix and there is an adequate index to species, pesticides and subjects.

J. S. ASH

The Birds of Berkshire and Oxfordshire. By M. C. Radford. Longmans, London, 1966. 212 pages; frontispiece and 19 black-and-white plates; 2 maps. 42s.

An up-to-date account of the bird life of these two counties has long been needed and Mrs. Radford has placed us deeply in her debt by undertaking this arduous task. The resulting volume is compact and easy to handle, well produced and replete with information.

Of the introductory chapters which fill the first 39 pages, I enjoyed

especially the well-documented historical section of the contribution by E. L. Jones on the Lambourn Downs and the short but informative account by L. R. Lewis of the Kennet Valley and its birds. C. M. Perrins provides a useful 'Historical Background' and Raymond South has written enthusiastically on Windsor Great Park and its neighbourhood. One wonders on what principle the selected areas were chosen, for other localities or habitats quickly suggest themselves and with both the Reading and the Oxford areas so fully documented it seems odd that neither should be represented here. Introductory chapters arranged by habitat—chalk downs, heath, forest, gravel pits and so on—would have been illuminating.

The systematic list itself, on pages 40-195, gives ample evidence of the magnitude of the task undertaken and I suspect that most people will find much that is new to them, as I did, especially concerning such birds as the Redstart which have a 'patchy' distribution in the two counties. A valuable feature is the extraction in many instances of relevant ringing recoveries. But some criticisms must be made. For example, I should like to have seen information for the two counties clearly separated and records arranged in a more systematic manner. Ambiguity of statement is not always avoided and it is a pity when such records as those of the Scaup are set out according to no obvious plan.

Perhaps as a result of the non-standardised manner of presentation, perhaps because the author must inevitably know some areas much better than others, the general impression of the status of a species is not always satisfactorily conveyed. Although my acquaintance is closest with the Reading area, I have misgivings in this respect over the statements given for the Golden Plover, Green Sandpiper, Kingfisher, Willow Tit and Yellowhammer. The last is a case (and there are others among common species) where a fuller account would have been more helpful.

Some errors are perhaps to be expected where so many records are being handled; but they undermine one's confidence in the rest. The Black-throated Diver at Whiteknights Lake in 1950 in fact stayed six weeks; the Red-necked Phalarope (which, incidentally, is misplaced in the index) visited Marsh Baldon in 1960, not 1950; the Ring-necked Duck came in 1959, not 1960. Again, on what basis are certain records omitted? Why is there no mention of the pair of Red-crested Pochards at Woodley on 12th March 1960? Why is the Montagu's Harrier watched at close range at Manor Farm on 20th April 1959 left out, whilst the apparently less well documented Marsh Harrier seen by the same observer at Sonning Eye in December 1958 is included?

The sketch-maps are very useful and the gazeteer a valuable addition. The excellent photographs—mainly of habitats, but including a few of

birds—are pleasing and highly evocative of the scenes we know. Every ornithologist with any interest in the two counties will wish to possess this book and will be grateful to Mrs. Radford for the lasting service she has rendered in writing it.

E. V. WATSON

Letters

Birds disposing of dead nestlings

Sirs,—The recent notes and letters by W. G. Luton, William H. Payn and H. Mayer-Gross on birds disposing of dead nestlings (*Brit. Birds*, 58: 443; and 59: 119-120), as well as the note by the Rev. R. Charles Long on a House Sparrow *Passer domesticus* carrying a live nestling (*Brit. Birds*, 59: 114-115), brought to mind James M. Hartshorne's extensive work on the Eastern Bluebird *Sialia sialis* of North America. He found that nest sanitation in this species included the removal of dead nestlings, usually by the female parent.

Hartshorne's paper, published in 1962 in *The Living Bird*, first annual of the Cornell Laboratory of Ornithology (pp. 131-149), reviewed observations of behaviour at the nest and included nine experiments in which dead young Eastern Bluebirds were placed in nests containing living broods. His studies were carried out at nest-boxes fastened to rigid, light-tight blinds (hides) in such a way that the interior of box and nest could be observed at a distance of a few inches.

It was found that as soon as the young had hatched, and during most of the nestling period, the hen Eastern Bluebirds frequently inspected their broods, and poked or gently pecked each individual in turn. If there was no response to this, the hen pecked a little harder, and a live nestling then moved to escape such treatment, whereupon the hen attended another nestling. When a dead nestling was encountered, the pecking continued, increased in severity and turned to tugging, and the carcass was then lifted from the nest, carried out and dropped at some distance from the nest-box.

A small carcass is easily disposed of; one that is half the weight of an adult is easily picked up, but presents some difficulty; and the parent may not succeed in removing a larger one. The difficulty arises when the entrance hole is too small to permit passage of the adult and a large carcass at the same time.

In six of the nine cases in which dead nestlings (always approximately the size and weight of the living) were placed in or on a nest, they were removed and carried away by the female. Circumstances caused the termination of the other three experiments before the carcasses were

discovered. When a dead nestling was placed on a nest but not in the cup, it was immediately disposed of, as was any foreign object. Placed in the cup among live nestlings, however, it escaped detection for from five minutes to more than an hour while the young were fed and brooded, and was only 'discovered' during a routine probing session by the female.

It is quite possible that the cock Eastern Bluebird also disposes of dead young on occasion. One seemed interested in a carcass and appeared to probe it, but at that point the hen entered the nest-box and she took it out. The cock assists in feeding and nest sanitation, but does not brood nor usually spend the night in the nest-box, so the hen has more opportunity to discover a dead nestling.

ADEN L. GOKAY

Meat or sickly sweets

Sirs,—I feel sure that I am not alone in wishing to record my disappointment at some of the contents of the July 1966 issue of *British Birds*.

In view of the quite high annual subscription, one wonders what possible justification there could be for publishing twelve pages of photographs of the rear quarters of distinguished ornithologists, marching distinguished ornithologists, and happy distinguished ornithologists, when elsewhere in the issue one reads that no less than 27% of the 1965 records submitted to the Rarities Committee have been rejected. Surely twelve pages of plates, or even text, dealing with the rear quarters of some of the species which have given the biggest headaches to the Committee would have been of far greater value.

Finally, may I entertain the hope that during the tour of the 'bird islands' there was no repetition of the conduct shown in plate 46a where, even if Britain is not actually represented at the nest, help is arriving fast! It is hardly a good advertisement for the last sentence of the third paragraph on page 259.

Please, let us have meat, not sickly sweets, for our £2 13s.

PHILIP S. REDMAN

News and comment

Edited by J. L. F. Parslow

Fight for Upper Teesdale continues.—The final outcome of the campaign directed against the proposal to build a reservoir in the botanically unique area of Upper Teesdale (see *Brit. Birds*, 59: 46) is of vital concern to the bird conservationist,

even though in this particular instance he may not be directly involved. It is becoming increasingly clear that the future of the whole conservation movement may well stand or fall on this one issue. If it fails here the outlook is bleak indeed, for it seems improbable that any future campaign will deserve or receive such massive scientific, public, political and financial support as this one has done. Even so, advocates of the reservoir are so far winning the day, and despite considerable support in the House of Commons on 28th July for Marcus Kimball's private motion to reject the Bill allowing the reservoir to be built, this was still insufficient to prevent the Bill passing the report stage. Particularly disappointing features of the debate of this 'the most important conservation issue that has ever come before the House', were the rejection by their respective ministries of the advice given by the National Parks Commission and the Nature Conservancy, and the personal (if 'greatly reluctant') support for the Bill by the Minister of Land and Natural Resources himself.

The Teesdale Defence Committee, continuing its fight, petitioned the House of Lords to reject the Bill which, as we go to press (November), is in Committee there. A public protest meeting on 20th October at the Caxton Hall, London, under the chairmanship of Dr. Bruce Campbell, with speakers including James Fisher (newly appointed a member of the National Parks Commission), Tom Stephenson and Dr. S. M. Walters, was believed to be the first such meeting ever called by naturalists. Particularly in view of the continued growth in public opposition to this scheme, the Teesdale Defence Committee is hopeful of success and has launched a new appeal for another £7,000 to finance the struggle. Contributions may be sent to the Upper Teesdale Defence Fund, c/o British Museum (Natural History), London W.7.

Opinion poll on wildlife conservation.—The results have recently been published of a survey of urban opinion and views on wildlife conservation, organised and carried out privately in the Bristol area by C. Fuller. In all, 156 people, selected at random, were interviewed, and although this sample is small and the survey has other shortcomings, it is of interest in providing for the first time a guide to what the average town-dweller thinks about certain aspects of conservation. A gratifyingly high proportion of those interviewed expressed a general interest in natural history, appreciated the need for conservation (though without necessarily realising what this entailed), and said they would be willing to contribute to a conservation fund if asked. Only a minute fraction actually belonged to a conservation body, but rather more than half those interviewed said they would be willing to provide spare-time practical help. Much of this interest was probably theoretical, but, even so, the willingness to help was clearly genuine in some cases. Although many of those interviewed were aware of the existence of national and international voluntary organisations concerned with conservation, fewer realised that local societies existed, and fewer still knew of the existence of the Nature Conservancy.

The answers to those questions concerning the factors which are having an adverse effect on wildlife provide an interesting reflection of the influence of recent publicity. Almost everyone believed that the use of pesticides was having a harmful effect, while large-scale poaching, and hunting and shooting for sport were also high on the list; many fewer people were aware that the drainage of marshland might be harmful to wildlife. What emerges from the survey most clearly is the tremendous influence that the natural history television programme has had, both in creating a widespread interest in wildlife, and in furthering the cause of conservation.

Oil pollution survey.—Despite the development of new methods of cleaning tankers by the major oil companies, the introduction of national and international

legislation regarding the discharge of oil at sea, and the public outcry that goes up whenever beaches at holiday resorts become polluted, the whole problem of oil pollution around the coast of Britain continues to be a serious one. There appear to be few signs that it is improving, and during the 1965-66 winter more dead and dying seabirds were washed ashore in south-west England than almost ever before. More recently, a great quantity of crude diesel oil, discharged into the Medway estuary in north Kent on 18th September 1966, caused the pollution of 8,000 acres of saltings and the deaths of well over 2,000 birds, mainly gulls and waders. In order to gain more information about oiled birds, a special 12-months survey is now being launched by the Royal Society for the Protection of Birds. Observers are being asked to make regular counts, preferably at weekly intervals, of the numbers and species of oiled birds found, whether alive or dead, on convenient stretches of beach.

The survey is being organised in collaboration with the Seabird Group, and the results will be submitted to the British Section of the International Council for Bird Preservation for use in the general campaign against oil pollution of the sea. Two forms are being issued, one for a general census and the other for the collection of more detailed scientific information. Observations are required from as many parts of the British coast as possible, and anyone willing to help in the work is invited to write to the R.S.P.B., The Lodge, Sandy, Bedfordshire, stating which of the two forms they require.

B.T.O. bird-watchers' conference.—The British Trust for Ornithology's second national bird-watchers' conference is to be held at the Hayes Conference Centre, Swanwick, Derbyshire, from 2nd to 4th December 1966. Attendance is open to all bird-watchers and their friends, though priority in booking places will be given to members of the B.T.O. The conference incorporates the 27th annual general meeting of the Trust which will be held on the Saturday evening. At the annual dinner which follows, the 1966 Bernard Tucker medal is to be presented to James Fisher, who for many years was the Trust's honorary secretary. Lectures during the conference will be given by E. M. Nicholson on 'Future trends in ornithology', Robert Gillmor on 'Bird art', and A. Dobbs and Dr. A. K. Kent on 'The ornithology of Nottinghamshire'. Other speakers include members of the Trust's staff. Films, local field excursions and an exhibition of modern bird art have also been organised. The inclusive charge for the weekend is £4 15s. Full details are available from the Secretary, B.T.O., Beech Grove, Tring, Hertfordshire.

Proposed conference of local report editors.—In September 1956 a well attended and successful one-day conference of editors of local bird reports was held in Oxford under the joint auspices of *British Birds* and the British Trust for Ornithology. In the ten years that have elapsed since this conference there have been many new developments, and it is felt that a further conference to discuss these and other topics would be profitable to all concerned. It is proposed to hold such a conference in 1967. Meanwhile, a preliminary meeting, to which all editors of local reports are invited, is to be held at 11.45 a.m. on Saturday, 3rd December 1966, during the B.T.O. bird-watchers' conference at Swanwick (see above). It is hoped that most editors will already have received full details of this meeting and also a summary of the findings of the 1956 conference. But those who have not—and in some cases it has been difficult to trace the name or address of the current editor—are requested to contact the secretary of the B.T.O. at the address given above. It should be emphasised that this initial meeting is essentially a preliminary to the 1967 conference, and that discussion will be confined to general rather than specific subjects.

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J. B. Nelson

(with four plates)

The effect of beech crops on Great Tit populations and movements

C. M. Perrins

Notes

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Recent reports

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British Birds

Vol. 59 No. 10
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The behaviour of the young Gannet

By J. B. Nelson

(Plates 66-69)

INTRODUCTION

THIS PAPER is a sequel to the description of breeding behaviour in the Gannet *Sula bassana* (Nelson 1965). It covers a part of its life history for which a reasonable understanding depends on long watches throughout its development. The widespread and still repeated fallacy of the 'starvation period' as applied to Gannets (e.g. Kay 1949, Palmer 1962, *A New Dictionary of Birds* 1964) shows the result of intermittent observation.

The relationship between parents and young, no less than that between mates or neighbours, reflects the character of the social organisation of the species. As I emphasised in the previous paper, Gannets, particularly males, have evolved highly aggressive territorial behaviour and this has had an important influence on their pair and wider social relationships. Thus it has led to the corresponding development of female tolerance of male aggression and of special female appeasement behaviour—both to an extent unique within the Sulidae. Similarly, it has influenced the nature of the chick's behaviour to its parents and neighbours. Chick behaviour is also highly relevant to the subject of Gannet adaptations to cliff-nesting. There are therefore at least two major themes—the extent to which aggression has shaped Gannet breeding behaviour and then the nature of its cliff-nesting adaptations—to which the behaviour of its young can contribute.

As before, the evidence given here is mainly from a three-year study during 1961-63, with further observations in 1965, on the Bass Rock, Scotland.

THE CHICK

Chick growth has been described in an account of twinning experiments (Nelson 1964a); particularly interesting is the rapid increase in

weight from 60 grams to a maximum of about 4,500 grams in eight to nine weeks, and the almost unimpeded growth compared with the slow and violently fluctuating development of boobies *Sula spp.*, due to their erratic food supply.

The first, sparse covering of down is, of course, inadequate for the control of body temperature and the young Gannet is fully altricial. Its eyes are open by the second day after hatching.

CARE OF YOUNG

Gannets brood their chicks on top of or between their webs (fig. 1) for up to a fortnight after hatching. This change from incubating the egg underfoot to brooding the chick on top of the feet is obviously important. Even though it occasionally fails and the chick is trampled to death, the adult may (too late) respond either to the different 'feel' of the object or to its configuration and prise the flattened chick from the bottom of the nest, placing it in the correct position on top of its webs. When moving a very young chick the parent often opens its bill widely and tremors each mandible, one on either side of the chick, thus nudging it along in a series of fine movements (fig. 2a). Gannets moving eggs usually keep their mandibles closed or only slightly open, and they sometimes move chicks in the same way (fig. 2b).

As long as it is able, the chick pushes its head and foreparts beneath its parent for shelter. Its increasing fat layers and thickening down subsequently protect it from almost all weathers; the only deaths due



FIG. 1. Adult brooding day-old chick on top of webs. Note the ruffled ventral feathers which probably aid the transmission of warmth to the chick; the feathers in the nest, which soften it; and the dirt on the tip of the adult's bill, the result of probing to remove lumps from the nest bottom



FIG. 2. (a) Adult moving small chick by placing one mandible on each side of it and then trembling both mandibles. (b) Adult moving chick in egg-tucking manner, with mandibles slightly parted

to climatic conditions occur during heavy, prolonged rain with wind and low temperatures, which happen not infrequently in late June. A minor advantage, considering the population as a whole, of the Gannet's habit of producing its eggs over a period of several weeks rather than within a week or two, is that it thereby avoids the possibility of mass mortality among young as a result of climatic factors. The onset of rain stimulates parents to try to tuck even large young beneath their breasts. During hot weather chicks sprawl listlessly on the nest or, panting heavily, stand with drooping wings; during development these are heavy with blood-filled quills. Often they support themselves on their tarsi, exposing the under-surfaces of the webs and presumably aiding heat loss. I never saw a Gannet chick elevate its posterior, as some boobies do presumably to facilitate heat loss from the cloacal area; nor do Gannet chicks use their beaks as a prop, by piking it in the nest to form a tripod between beak and legs, as Red-footed Boobies *S. sula* do.

Throughout the entire period spent on the nest (90 days on average) the chick is constantly attended by a parent and for some 15% of daylight hours by both parents. At first this obviously protects vulnerable young from such predators as Herring Gulls *Larus argentatus*; Gannets with eggs or young watch hovering gulls intently, with head retracted and bill vertical, and lunge at them if they approach (fig. 3). Even man is liable to be attacked at this stage. Later the guarding of the chick seems necessary to protect it from attack by neighbours or from intruders looking for a site within the colony. This aspect of the relationship between adults and young further supports the view that aggression has dominated Gannet behaviour. No booby, except the Peruvian Booby *S. variegata* which is closely comparable to the Gannet in its dense and mainly cliff-nesting habits, guards its young beyond the



FIG. 3. Three incubating adults menacing an approaching Herring Gull *Larus argentatus* on the fringes of the nesting group. No bird predator can prey significantly on the eggs or young unless man disturbs the adults first

period of protection from weather and predators (four to five weeks).

Chicks virtually ignore hostilities between adults and may go to sleep during menacing bouts with the neighbour's threatening beak an inch or two from their face. Bill-hiding (pages 408-410) occurs only if they are actually pecked. In the (rare) absence of the female, chicks receive the biting of the incoming male and may also act as the substitute in his re-directed aggression.

The chick is fed (plate 67c) on average 2.7 times per day from about one month onwards (this figure refers to bouts of feeding and not to individual entries, an entry being defined as one insertion of the chick's bill into the adult's mouth; there may be several insertions in one bout of feeding). In the early stages it is fed small amounts more frequently. The adult spells of brooding average 22 hours in the male, 19 hours in the female.

PARENT-YOUNG RECOGNITION

Before giving details there is a general point to make. One can never show that a parent does not recognise its young, in the sense of passing on to the optic lobes a slightly different pattern of stimulation from the retina than that given by any other chick, but only that it will react favourably even to a strange chick. It may or may not be a fair inference that it actually does not perceive any difference; probably it does, but the behavioural reaction of rejection would presumably only evolve where it was of sufficient reproductive advantage. In the Gannet, where in fact the young normally stay strictly on their nest, adults would be unlikely to have evolved rejection behaviour towards strange young; hence, provided these were presented in the correct

context, namely on the nest, one would expect them to be accepted.

Many colonial species, on the other hand, attack strange young of their own kind. For example, Arctic Terns *Sterna paradisaea* attack intruding chicks if they approach for food (Cullen 1956). Black-headed Gulls *Larus ridibundus* and Herring Gulls kill strange chicks if these wander onto their territory, as I have myself observed. Guillemots *Uria aalge* apparently recognise their chick on a crowded ledge even if it has moved position slightly (Uspenski 1958), though Tschanz (1959) found that the chick plays a part in the process. King Penguins *Aptenodytes patagonica* (Stonehouse 1960), Yellow-eyed Penguins *Megadyptes antipodes* (Richdale 1957) and albatrosses (Rice and Kenyon 1962, and personal observation for the Waved Albatross *Diomedea errorata*) also recognise their young or are distinguished from strange adults by them. Even when the young of Adelie Penguins *Pygoscelis adeliae* have formed creches, the adults find and feed only their own (Sladen 1953). In most species this recognising ability gradually matures; substitutes are accepted when chicks are small, but not later. Young Shags *Phalacrocorax aristotelis* gather on the sea-rocks after fledging and are fed by their parents, although after becoming active and until about a month old chicks 'often go to neighbouring nests and are accepted' (Snow 1963), something one certainly would not expect. In fact, the Red-footed Booby develops strong powers of discrimination between its own and other young precisely at this stage in their development; at least it quickly drives away strange young that attempt to 'poach' and even the young themselves suddenly begin to attack intruding young, which they formerly did not. Coots *Fulica atra* will adopt young if they are less than 14 days old and resemble their own in size; otherwise these may be killed (Alley and Boyd 1950). Young coots therefore imprint on their parents. Similarly, female seals and sea-lions reject strange young in the rookeries. It is seldom possible to know how the distinction between young is achieved, though calls appear to play some part.

In the above species it is clearly advantageous to reject strange chicks, since their habits result in many chicks approaching and begging from strange adults. To accept them could result in the inadequate feeding of all. On the other hand, in the Gannet, as also in the Kittiwake *Rissa tridactyla*, because chicks normally stay on the nest there is usually no danger of feeding strange ones.

The Gannet is well able to distinguish individual adults. This was proved repeatedly by the way in which a sitting bird reacted to its mate long before it actually landed at the nest, or to a particular rival as it flew over or walked about in the fringes of the colony, as well as in particular cases, such as a female who had changed sites and mates but was regularly allowed to use her old nest as a take-off point and was then briefly greeted when her old mate was there. A bird might

therefore be expected to recognise its own chick. A series of substitutions, designed to answer related questions, was carried out.

First, does the adult respond appropriately to a chick hatching from a substituted egg before its own egg would have hatched and, if so, how long before its own would have hatched? Eleven chicks, which hatched from donated eggs as long as 32 days before and 19 days after the egg of the foster parent would have done, fledged successfully at the usual age. The adults therefore reacted appropriately to eggs which hatched considerably out of step with their own internal condition, if this changes with the length of time elapsing since laying. It is reasonable to assume such a change, though its exact nature and the rate of change are unknown; thus the ability of adults to accept such 'early' or 'late' chicks does not show that there is no change in responsiveness of the adult as a result of incubation, but rather that any change within the limits of the experiment were too small to affect the chick's growth and survival. Several other instances of the very variable relationship between physiological condition and external situation were mentioned in the previous paper (Nelson 1965). Hormonal state is the coarse adjustment, and reflex neural response to external stimuli the fine one. In other words there is no precise relationship between such a factor as the lapse of time between two successive physiological states and the stimulus value of, say, an egg or a chick; one bird will combine time lapse and external stimulus to produce a response different from that of another bird combining exactly the same factors.

Secondly, do adults which have experienced their own chick thereafter react to it differently from any other of similar or dissimilar age and, if so, at what age of chick does this discrimination by the adult occur? Does the adult need to experience hatching? These substitutions were in three categories: eggs for chicks; chicks for eggs; and chicks for chicks of different ages.

Eggs for chicks

In four out of five cases the adults accepted eggs in place of chicks varying from three to 17 days old. In the fifth case the chick was 23 days old and the adult treated the egg as nest material.

Thus, at least for the first two weeks after hatching, adults will often return to incubating though they may lose this reversibility after about the third week. Infertile eggs may be incubated for at least eight weeks beyond the normal hatching date, which shows what a large part external stimuli play in terminating incubation, yet three weeks after hatching a chick a bird will then reject an egg. It may therefore be concluded that experiencing the chick over a relatively long period subsequently reduces readiness to incubate. Here, as in chicks for eggs, there is clearly no sudden switch in behaviour as the result of

external stimuli, but rather a slow internal change to which external stimuli (e.g. egg, young chick and so on) contribute cumulatively.

Chicks for eggs

In all of six cases chicks of a considerable size range (age three to 23 days, weight 50 to 1,350 grams) were accepted instead of eggs. Chicks were thus provided nought to 16 days earlier and three and nine days later (in exchange for infertile eggs) than the 'expected' hatching date. Adults do not therefore require each year the experience of hatching an egg to enable them to switch over to the appropriate behaviour towards a chick, but we were unable to test ones that had *never* experienced a hatching egg. Of course, their method of feeding probably does not require any particular physiological state to accompany hatching (cf. pigeons, in which the production of crop milk is necessary and incubation behaviour ceases automatically a few days after the chick is due to hatch). In a comparable way, we showed that females do not need to experience laying in that particular season before they will accept and incubate an egg, though the nearer they approach their laying date the more readily they accept a donated egg.

Chicks of differing ages

Six exchanges were made involving pairs of chicks differing in age by nought to seven days and covering an age range of two to 36 days. All substituted chicks were accepted, showing that up to this age of chick at least a Gannet will accept young differing considerably in age from its own.

In fact, observations of 'natural' situations showed that occasionally chicks ten to eleven weeks old wandered on to a nest during the adults' absence as a result of human disturbance, and were accepted in lieu of or in addition to the rightful chick. In one case the rightful chick was smaller and died competing with the intruder, but usually, if both chicks were large, both survived despite an age difference. Also, in at least 20 cases, adults whose own chicks had fledged accepted and even fed chicks which paused at their nest en route to the cliff edge. For example, a juvenile fledged on 3rd September 1961, and on 7th September another arrived at the nest from one further inland, was accepted and remained for 24 hours. Another juvenile fledged on 4th September and a stranger was accepted from 8th to 12th September. Further, in one case a strange chick was preened by the chick at whose nest it stopped, though the usual reaction of owning chick to intruder is attack.

To balance this picture it is necessary to add that in the presence of their own young adults usually discriminate against a strange chick *if they see it arrive*. Under such conditions it is, of course, a wandering chick and as such fiercely attacked. This may well be because in such

circumstances an intruding chick shows evident signs of fear which a rightful offspring would not. In most of the cases given above, circumstances were different in that the rightful chick had left the nest when the intruder arrived. Even when an intruding chick gains the nest it is by no means automatically accepted. Having seen it arrive, the adult usually continues to attack, though occasionally it will eventually desist. It seems that short-term 'recognition' is involved here since, where rightful and intruder young are together on the nest, adult attack is directed solely to the latter, even when the chicks exchange position. But such 'recognition' need involve only spatial discrimination of two movable objects, neither of which has been lost to sight. If the rightful chick is then removed the adult will accept the other, though in such a situation the adult has left the nest, due to the disturbance, and returns as to a 'normal' chick.

Yet observations revealed puzzling variation in parent reaction to their own chick off the site; sometimes they attacked and other times they accepted them. In one instance a female who was attached to two nests, one empty, attacked her own chick fiercely when it tried to join her on the second nest, but accepted it when it, and later she, returned to the proper nest. However, adults also tend to defend their chicks slightly off the nest. Therefore one cannot say that parents accept a chick, their own or another, only and precisely at their own nest; but chicks are certainly more likely to be attacked away from it. Similarly, females are powerfully inhibited from attacking an intruding male on the nest, but aggression may be released as soon as either bird moves off the nest. Of course, adult Gannets attack intruders of their own sex without such inhibition. Sometimes an adult whose chick had moved on to an empty nest near-by and been threatened or attacked by a neighbour jumped across to engage the attacker. This naturally gave the strong impression of parent defending its chick even though the latter was 'off' its rightful nest. Yet on other occasions an adult ignored serious attacks on its off-site chick. The great variability in the reaction of the adult to its own and other young remains a puzzling feature of its behaviour.

Gannet chicks definitely recognise their parents. Thus, we twice noticed that fringe chicks which had wandered some yards off the nest (a rare event possible only from nests on the extreme fringe) recognised their parent and rushed to beg, even though it landed not on their own nest but on an empty nest near-by. Yet the chicks had not responded to other adults landing similarly near to their nest. It also seemed, though I could not prove the point conclusively, that recognition could be either visual or auditory. Auditory recognition is certainly within their ability and it seemed, in two cases where parents landed with relatively little calling, that the chicks (which were some feet away in the fringe) ignored this, but after a few seconds turned

their heads, saw the adult and immediately went to beg for food. Despite this ability, chicks displaced either naturally or experimentally, will remain with foster parents if allowed to do so. Again, this may be seen as an adaptively flexible response; if the chick can regain its nest it does so; otherwise it makes the best of any haven that offers.

It would be a disadvantageous division of labour if some pairs reared their own and a neighbour's chick. The aggression of the adults towards wandering chicks and the cliff position of many sites, to which the young respond innately by staying strictly on the nest, make it unlikely that a Gannet chick will normally find its way on to a strange nest.

In summary, Gannets accept chicks of widely differing ages in place of their own egg. They do not require either the experience of the full incubation period (or even half of it) or of hatching to respond appropriately to the chick. Their reaction is reversible for some time and they can change from chick care to incubation and back again. They also accept substituted chicks widely different in age from their own and over the entire range of the chick's growth. However, they fiercely attack wandering chicks and chicks outside the strictly delimited area of their nest. This, together with the chick's innate tendency to remain strictly on the nest means that parents are rarely called upon to discriminate. The biologically desirable goal of feeding only their own offspring is usually achieved without discrimination on the nest; whether there is ability to distinguish their own young from others remains unshown but probable, even though unexpressed behaviourally. On the other hand, chicks appear to recognise their parents and, as shown below, their sites.

ADULT AGGRESSION TOWARDS CHICKS IN THE COLONY

Adults, even non-breeders on the fringe, are conspicuously aggressive towards unattended or wandering chicks of any age, and after the colony had been disturbed several females attacked unattended chicks indiscriminately. I also have many records of adults leaving their own nests to attack unattended young near-by. Even a small, downy chick releases violent attack. One such chick, already almost dead from previous attacks, crept up to a nest with a chick of similar age and lay there. The adult on duty attacked it violently and killed it. When change-over took place the incomer did not apparently notice the dead chick for some time, but later launched a berserk attack for several minutes, calling stridently and striking repeatedly at the chick. Similar adult attacks were recorded on dead, feathered young. This frenzied reaction to a chick outside the nest was never seen in any of the boobies. There can be no doubt that an unguarded Gannet chick, on or off its nest, powerfully incites attack from adults.

Gannets rarely leave their chicks unguarded, even for a moment,

unless one parent dies or a spell of bad weather occurs during the later stages of chick growth or it is very late in the season. I have five records of unguarded chicks killed by neighbouring adults, even though the chicks remained quietly on their nest and performed the usual appeasing behaviour (see below). Boobies terminate their chick guard period when the young are about a month old and able to withstand temperature changes. Although unoccupied White Boobies *S. dactylatra*, males in particular, occasionally attack unguarded young they never, in my experience, kill them except when they attack young Red-footed Boobies. In these circumstances the unfortunate Red-footed chicks release severe and occasionally fatal aggression because they entirely lack the appropriate appeasement behaviour and by retaliating elicit full adult attack.

In the Gannet, adult hostility may be an effective method of discouraging chicks from wandering and may therefore be advantageous, but the habit of attacking non-trespassing chicks seems, so far as the species is concerned, to be a dysgenic extension of a functional behaviour pattern. Non-selective and apparently of no advantage to the performer, it has persisted perhaps because there has been no selection pressure capable of eliminating it without incurring other disadvantages. If adults did not attack unattended chicks in this way, members of a pair could fish simultaneously, thus increasing their food gathering capacity, which could be important in a less constant environment, but seems relatively unimportant for the Gannet. One may say that the favourable feeding environment of the Gannet has permitted the evolution of adult aggression even with such side results, whereas the relatively unfavourable feeding environment of most boobies would, quite apart from its other effects, prevent the evolution of aggression which involved curtailment of the pair's hunting activities. The Gannet's favourable feeding environment is made evident by the facts that the young grow to over 4,000 grams, or 150% of the adult weight, in the very short time of 12 weeks; that starvation among them is virtually unknown; and that even the huge additional burden of a second chick, experimentally donated, makes little difference to the growth of such young compared with normal singletons (Nelson 1964a). On the other hand, there is indisputable evidence that several booby species suffer from frequent though irregular food shortages. The erratic nature of their supply leads to high chick mortality through starvation (Nelson, in press) and permits only a slow and erratic growth of the survivors. Thus, even the small Red-footed Booby takes 20 weeks to reach fledging age and a weight of around 1,000 grams, and even subsequently is supported by lengthy post-fledging feeding by its parents.

On the rare occasions when a number of Gannet chicks in a group on flat ground were simultaneously left unattended they wandered about

and indulged in playful behaviour, showing that it is apparently adult aggression which chains them to their nests.

In summary, wandering chicks are strongly attacked by adults, even though the chicks, as individuals, would be accepted as substitutes for their own. The tendency to attack off-site or unguarded chicks effectively discourages wandering or the absence of both parents together.

ADULT AGGRESSION TO NEWLY-FLEDGED JUVENILES

Newly-fledged young, unable to rise from the water, are often attacked by adults and immatures near the colony. These attacks may be prolonged and concerted, involving over a score of attacking adults for more than an hour and occasionally leading to the return of the waterlogged juvenile to the Rock or even, in a few cases, probably to its death. The first young to fledge are particularly prone to attack. Again, one can see no functional advantage of aggression in that situation. For natural selection to eliminate such attacks it would be necessary (a) for them to be sufficiently disadvantageous to the species in terms of the number of young dying as a result, to exert an appreciable selection pressure and (b) for there to be a mechanism by which such pressure could be exerted. This could not be through the normal reproductive differential of the breeding pair, since the survival of their chick could, in the case of indiscriminate attack by adults at sea, depend on other, possibly even non-breeding, individuals. Thus there would be no obvious way in which the tendency for a particular bird not to attack young at sea could beneficially affect its breeding success and hence propagate the trait. However, it may be possible that a form of group selection could eliminate a sufficiently disadvantageous trait, though this question would lead the discussion too far afield here. I interpret the situation to mean that these attacks are harmless to the species and therefore that adult aggression has escaped the need (assuming there could be a mechanism) for sophistication which would distinguish between young at large in the colony to be attacked with advantage to the species (a statement which does not, of course, imply any such realisation in the individuals concerned) and young at large on the sea, where attack brings no advantage.

CHICK BEHAVIOUR

The behaviour of the chick will be described in order of its appearance. The behaviour patterns concerned are all described in the context of adult behaviour in Nelson (1965).

Food-begging and feeding

During the first few days little is seen of the constantly brooded chick except wobbly head movements beneath the adult. Clearly recognisable food begging behaviour from the young was first seen at the

age of about ten days, the chick reaching up and nibbling at the under-surface of the adult's lower mandible. However, the cheeping calls and the more unco-ordinated movements that it carries out from the first day may stimulate the adult to offer food; it is hard to settle this point. Such behaviour is certainly not necessary to orientate feeding by the adult, and we saw adults bend their heads and offer food in a variety of unusual postures, without the slightest sign of prior activity from the chick. In one variant the head was bent over so that the upper surface of the upper mandible lay on the floor of the nest and the chick fed from the trough. Chicks may be fed even before they are clear of the shell.

Later, the chick pesters the adult by pointing its bill upwards (plate 68b, fig. 4), swaying its head from side to side and aiming mild lunges at the parent's beak. High intensity begging includes a repeated 'yipping' note, which is itself highly stimulating to the adult and may elicit regurgitation movements before the chick touches the adult's bill. It is interesting to compare the begging of Gannet and booby chicks. Gannets do not pester wildly nor do they use the violent wing movements of booby chicks; unlike Gannets, young boobies are often desperately hungry, even starving. Also, less vigorous begging, with closed wings, is a valuable adaptation to cliff nesting in the Gannet, by reducing the danger of the chick falling.

Young Gannets take fish directly from the mouth and throat of their parents by inserting their head, distending their gape by lateral extension of the rami of the lower mandible and depression of the floor of the mouth, thus enormously dilating the adult's pharynx, and transferring food directly by pumping movements. The adult's head is dragged forwards and downwards and the bolus, aided by active anti-peristaltic movements, passes over into the chick's mouth. After successful



FIG. 4. Feeding sequence. (a) The chick follows the movements of the adult's head, keeping the bill tips opposed. (b) In high intensity begging the chick may grasp the adult's bill. (c) The chick inserts its bill into the parent's gape. (d) After the fish has been taken both parent and chick gulp violently; note the food bulge in the chick's neck

transference both chick and adult point their bills upwards and, with retracted neck, gulp repeatedly to settle their meal and the remnants of the regurgitation respectively (fig. 4). Spilt fish is usually eaten by the adults, even to tiny fragments or bare back-bones, though sometimes it is flung away with vigorous motions of the head. Regurgitations caused by fright are seldom re-eaten.

Body care or comfort behaviour

At the age of about eight days, when the chick is still very sparsely covered with down and has only rudimentary wings, it makes its first attempts at wing-flapping (fig. 5), ordinary head-shaking and rotary headshaking. Sideways wing-stretching and wing-arching, with neck forwards and downwards and head horizontal, occur within the first fortnight.

Wing-exercising, as sustained bouts of wing-flapping (plate 69a, fig. 5), occurs from three weeks onwards, but does not become regular until the flight feathers have erupted, at which stage it is also unfailingly stimulated by rain. Wing-exercising bouts usually last about 30-60 seconds. At first the whole wing is flapped, but gradually the action of the proximal part decelerates until only the wing tip moves. It is usually performed facing the wind, except on narrow ledges where the young mainly face inwards, and it is not accompanied by walking orumping, as it is in Herring Gulls, for example. This would usually be dangerous. Young Kittiwakes, too, jump much less than other gulls (E. Cullen 1957), probably for the same reason. Nevertheless, a few Gannet chicks fall to their death as a result of wing-exercising.

Rotary headshaking remains relatively infrequent and even the period when down is shed produces nothing comparable to the spectacular increase which accompanies the adult moult of body feathers. Nevertheless, the full adult pattern, in which the hyoid is depressed, the head thrust forwards and the wings are opened and flapped (plate 68a) is recognisable.



G. 5. (a) Wing-exercising in ten-day-old chick still being brooded on parent's abs. (b) Six-week-old chick wing-exercising; the wing and tail feathers are growing rapidly at this stage

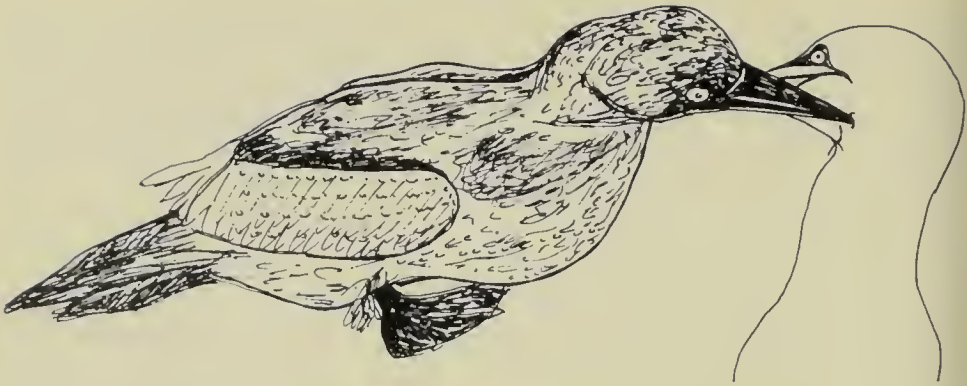


FIG. 6. Mutual preening between parent and chick

Chicks begin preening, nibbling their down, at about two weeks, though until the feathers grow it is relatively perfunctory behaviour. Adults preen their chicks from about one week and chicks begin preening their parents and mutual preening with them (plate 66c, fig. 6) from about ten weeks; the latter seems relatively rare in birds. Often chicks preen their parents on the wings and back, which allo-preening adults hardly ever do; the preoccupation which adults show with the others' head and neck apparently develops later.

'Oiling', the movement by which birds with an oil gland distribute the secretion over their plumage, including rolling the crown on the oil gland at the base of the tail before rubbing the wings and back, was seen from about eight weeks onwards (fig. 7). By this time the feathers are well grown, though still thickly covered with down in many places.

Yawning, that is mouth-opening involving only the lower mandible and not using the naso-frontal hinge as adults occasionally do to raise



FIG. 7. Fully-feathered young 'oiling'. The back of the head picks up oil from the preen gland and rolls it on to wings and back; this behaviour, which helps to waterproof the plumage, occurs before the chick leaves the nest



FIG. 8. Panting and gular-fluttering as an aid to heat loss is common in adult and young

The upper mandible, occurs within the first ten days. Gross distension of the inter-ramal skin to dilate the pharynx and accommodate fish occurs early in development, certainly by ten to 14 days, probably earlier. Gular-fluttering, so characteristic of the Pelecaniformes, also appears in this period and is seen (fig. 8) during hot weather or intense food begging.

Chicks sleep with their heads hanging over the nest rim (plate 67b), or curled round like a dog, until they are six to eight weeks old, when they begin to adopt the adult posture, standing or sitting with head in capulars. Even fully grown chicks, however, occasionally sleep prone, with head lying on the ground, a habit never found among adults. The persistence of juvenile or pre-juvenile habits is an interesting topic; young Herring Gulls, perfectly able to fly, will often crouch instead, though healthy adults never do so. One often finds that behaviour patterns occurring in young birds and later giving rise to adult behaviour patterns, are, in their new adult form, at first more like the original chick behaviour than in their later, fully differentiated form.

Although tiny chicks cannot void clear of the nest they apparently do not produce faecal sacs, and merely soil the nest. The adults occasionally dig in the nest bottom and fling away bits, but it is usually not possible to see whether soiled material is specially selected. Later,



FIG. 9. (a) The young collect and handle nest material from the vicinity of the nest. (b) Juggling with nest material is common play-behaviour and probably helps to perfect fish-handling movements

the chick voids clear of the nest cup. Direction of faeces downwards on to the side of the nest, as sometimes seen in adults, was not observed in chicks.

Handling nest material

Chicks show an interest in nest material (fig. 9a) from about two weeks, picking up straws, feathers and so on, and mandibulating them. Later they snatch grass or sea-weed from incoming parents and place it on the rim of the nest with nest building movements and mandible vibrating.

From about eight weeks they frequently 'play' with nest material (plate 66d, fig. 9b), tossing up feathers and sticks and catching them. This behaviour could help to perfect the co-ordination necessary for manipulating fish. It is usual for the young of higher vertebrates to 'handle' objects in their environment, thus gaining experience of various kinds. The young Gannet's apparently precocious interest in nest material is therefore not unusual.

Appeasement postures

Bill-hiding (fig. 10a), as in the Kittiwake, is the chick's response to attack by strange adult or larger chick, and appears during the first month; it is clearly a fear response. The bill is tucked either centrally or to one side beneath the body and the chick lies flat on the ground. The back of the neck is thus often the target for adult attack and is sometimes entirely denuded of down. As in adults, the muscles are extremely well developed here and enable birds to survive attacks that would soon kill other species. Adults often continue to attack, and sometimes preen, beak-hiding chicks for long periods up to about 30 minutes; the chicks' appeasement posture is, therefore, not immedi-

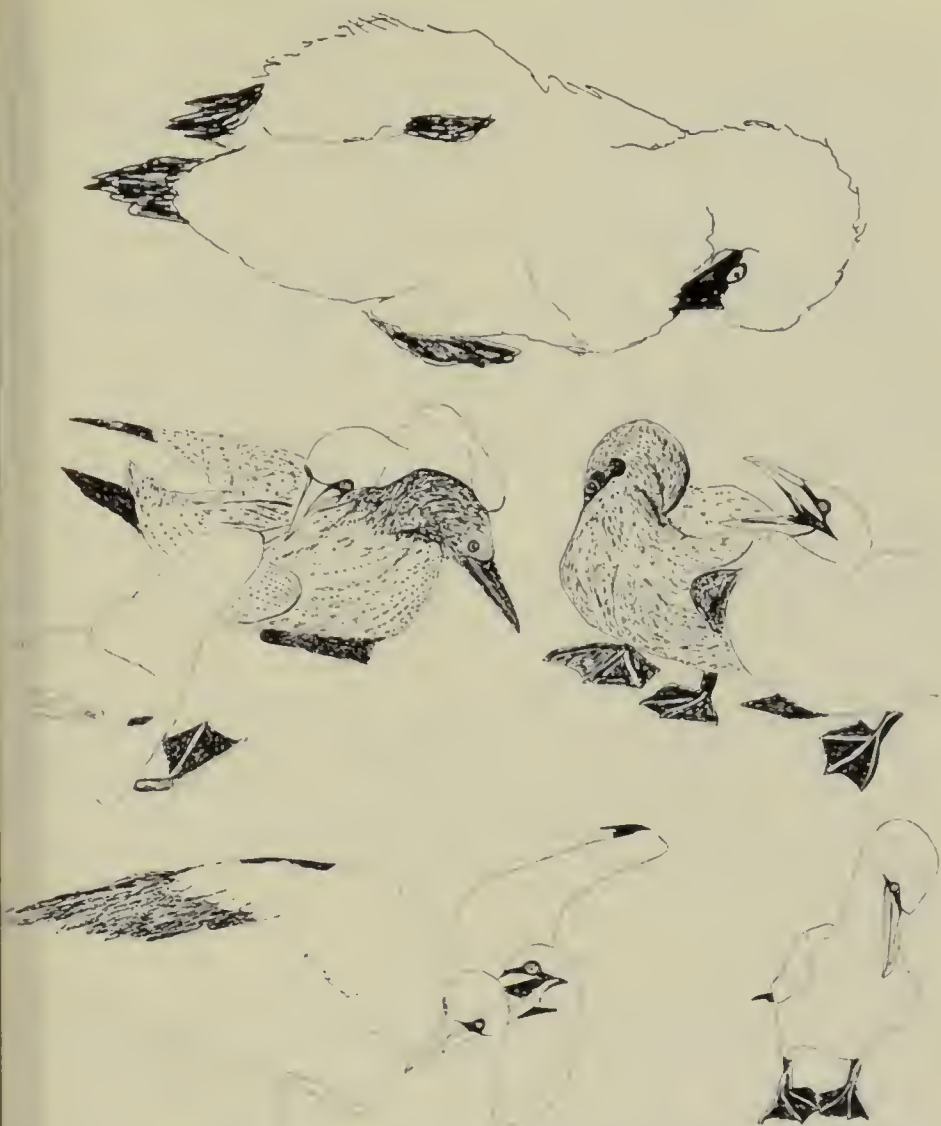


FIG. 10. Bill-hiding by the chick is the extreme response to attack (adult forms of bill-hiding are shown for comparison). (a) Full bill-hiding by six-week-old chick. (b) Incipient bill-hiding in response to aggression between parent and neighbours. (c) 'Facing-away' by juvenile in response to parent-menacing neighbour. (d) Adult female facing-away in response to biting by male; note that the bill is not tucked tightly against the breast as it is in the chick. (e) Adult pelican posture, which is an ambivalent aggression/fear posture (see Nelson 1965); this resembles chick bill-hiding, but its precise origins are not yet established

ely effective. Indeed, as already mentioned, the appeasement behaviour of the chick may be insufficient even to save its life. It seems desirable, where possible, to have some measure of the effectiveness of appeasement behaviour to avoid creating a false impression of its efficacy. Bill-hiding and adult facing-away are two relatively straightforward examples, compared for instance with the complica-

tions of the Black-headed Gull's head-flagging and, as one would expect, both have limited effect. Nevertheless, they are effective enough to confer survival value on their possessors. The stimulus eliciting bill-hiding is perhaps mainly tactile and quite independent of the presence of another Gannet. It may readily be induced by tapping the chick on the nape.

From about nine weeks chicks show facing-away (plate 67a, fig. 10c) in the form used by adult females, which also results in the beak being hidden (fig. 10d), but is different from bill-hiding as defined. They still continue the infantile bill-hiding. Chicks frequently and fleetingly face-away from each other, but bill-hide only when severely attacked by a much larger chick or an adult.

The adult pelican posture, in which the bill tip is pressed against the upper breast (fig. 10e), could be considered a reduced form of beak-hiding, but is rarely seen in chicks, although occasionally a brief form, passing into facing-away, can be detected. It is interesting that this posture, which is probably partly aggressively motivated should be lacking in the chick. It becomes more frequent in fully feathered young just before their departure.

Chicks are noticeably less prone to beak-hide from their own parents, even if these attack them. During the excessively boisterous attacks which large young make on their parents, facing-away sometimes occurs spontaneously without the parent having retaliated, the chick apparently associating its own aggressive behaviour with parental retribution.

Aggressive behaviour

Facing-away appears together with an increasing tendency towards aggression. Chicks menace each other when about a month old, but only perfunctorily. Later they develop adult-type (ritualised) menacing, darting their beaks towards each other, with the final sideways twist. They fiercely attack trespassing chicks, irrespective of size difference, and sometimes maintain attacks, accompanied by yapping, for long periods. This hostility doubtless helps to deter chicks from wandering and strengthens the effect of adult aggression in maintaining the one chick per nest system.

Chicks occasionally menace neighbouring adults, who normally ignore them, and from about seven weeks frequently menace and attack their parents (plate 66a, 66b, fig. 11) so severely that the adult female often faces-away and both sexes, but particularly the male, occasionally retaliate strongly. Chick attacks are delivered with the unco-ordinated movements typical of young animals; violent and mis-timed jabs, excited yapping, contortions and perfunctory self-preening are all mixed up. The stimulus received by an adult when the chick grabs its beak in an attacking manner never causes regurgitation, whereas the



FIG. 11. (a) Chicks frequently threaten and bite their parents, sometimes vigorously. (b) This may evoke threat response (and, rarely, attack) from the parent; note here that both chick and parent are threatening with the ritualised menace used between territorial rivals, turning their heads sideways (see Nelson 1965)

touch of the chick's bill in food soliciting does. It is unusual for young birds to threaten and attack their parents as much as young Gannets do. Even as youngsters they are aggressive and from the earliest age become conditioned to some of the inter-actions which are important to them later. It may seem surprising that the young of such an aggressive species 'risk' eliciting attack from their parents, but presumably the physical characteristics and appeasement behaviour of the young are enough to inhibit or switch off parental attack.

Wandering chicks, during fledging or as a result of exceptional circumstances already mentioned, are attacked by adults and any other chick within beak range. Already the aggression which is to characterise so much of their adult life is conspicuous. Since each nest contains only one chick this quarrelsome tendency is not disadvantageous, as it would be with two or more young in a cliff nesting species. In the Kittiwake one chick usually becomes dominant (E. Cullen 1957) and hence obviates dangerous fighting. An interesting difference apparently exists between the Gannet and the Australasian Gannet *S. serrator* in which chicks begin to visit each other from about six weeks and during the last two or three weeks before fledging gather in groups, exercise or wander about the gannetry, which is on flattish ground at Cape Kidnappers (Wodzicki and Robertson 1953). This represents a very significant difference and it would be interesting to have some objective measure of the aggression of this race for comparison with that of the Gannet.

Bowing and mutual fencing

Bowing, although extremely rare, does occur in chicks of eleven weeks or more. The bows observed were ill-defined, but clearly incorporated the headshake and an incipient dip, with wings partly open and were accompanied by shrill yapping (*cf.* adult calling). Equivalent aggressive territorial behaviour occurs in young boobies and in other

groups; long-calling occurs in Herring Gulls no more than eight weeks old (personal observation).

I also several times saw fully grown chicks performing a short bout of low-intensity mutual fencing with the female parent, following aggressive action by a neighbouring pair. This is exactly the situation in which the female would have fenced with the male had he been present.

By the time the chick fledges it may have shown all adult behaviour patterns (though it is unlikely to have bowed or mutual fenced) except copulation, aggressive nest biting, nest digging, gathering nest material, sky-pointing and behaviour associated with incubation and care of the chick. It is striking that even when chicks leave the nest they never sky-point, though adults almost invariably do so. This only develops in later social behaviour in the 'clubs' of immatures and young adult birds which gather on the fringes of the breeding groups and perform incipient sexual and aggression/fear behaviour.

CHICK RECOGNITION OF ITS SURROUNDINGS AND ABILITY TO 'HOME'

Young Gannets show a marked ability, in some cases persisting for more than two days, to return to their nest if displaced and this can save their lives. Abortive attempts at fledging, in which the chick has to traverse some distance between the nest and the cliff edge, sometimes end in its return by a devious route that it has certainly never before traversed. Similarly, young that wander due to disturbance by man often regain their nest even at the expense of terrible punishment en route, from which they may subsequently die. During such returns they will even travel downhill, an action they normally rigorously avoid. This is understandable since chicks displaced from their nests are almost always displaced downwards and the adaptive behaviour is obviously to climb upwards. In fact, they are well equipped to climb, and by using their beaks and claws can lever their awkward and heavy bodies up difficult inclines and the sides of the nest pedestal. So their readiness on occasions to travel downhill implies a powerful desire to regain a specific position in the colony and not just 'a nest'. The implications of this obviously powerful fixation which the young Gannet acquires as a 'gestalt' perception or whole spatial pattern, of its surroundings are interesting. Philopatry, the tendency for young adults to acquire nesting sites in the precise area of their birth, is known in many birds and Gannets show it to a pronounced extent. Since they are obviously strongly attached visually to their birth place and 'know' it even from unfamiliar angles, it seems no more than a reasonable extension to expect them to return there when, eventually, they come back to set up breeding territory. Obviously they cannot always, or even usually, acquire a site extremely near their nest of birth,

but they can and do nest in the general neighbourhood. As mentioned in my earlier paper, one occasionally notices unusually dogged attempts by a four or five year old male to establish a site in the middle of a group where there happens to be a slight gap, but one which nobody else has attempted to use for years. Probably such birds were born in that immediate area and are trying to re-establish themselves there.

Opinions differ as to the adaptive significance, if any, of philopatry. It may rest on the demonstrated suitability of that area for breeding or be an important mechanism in the production of a local, adapted geno-type (Wynne-Edwards 1962). Young Gannets from nests on cliff ledges are noticeably less prone to move from them than are young from nests on flatter ground. Emlen (1963) showed that a similar tendency in Herring Gulls was due to conditioning and was not innate; eggs transferred from flat ground to cliff nests produced young that behaved like normal cliff-edge chicks. Probably the same is true for Gannets, though if so it would be a case of a basically cliff nesting species, turned 'flat' nester, producing young which react appropriately to the two environments, whereas the Herring Gull exemplifies the converse. Even on flat ground, young Gannets normally remain on the nest, owing to the restraining influence of hostile neighbours.

As mentioned, large chicks of the Australasian Gannet seem to wander extensively, a seemingly slight but suggestive observation, especially when one links it with the apparently much paler under-parts of the juvenile of this species. My interpretation of the function of black plumage in the young Gannet is that it reduces the likelihood of parents, particularly the male, attacking their own young. I have described this view elsewhere, but a brief re-statement seems relevant here, too. During the latter half of the nesting season adult aggressive behaviour increases, whether measured by the incidence of overt aggression, threat, ritualised bowing (the aggressive site ownership display) or the amount of biting which the male inflicts on his mate when they meet. Simultaneously, the chick is attaining adult size and plumage. It is not fanciful to suggest that a youngster with adult plumage would on occasions release attack. This happens to the male even in old pairs and the male not infrequently redirects its attack to the chick when aggressive tendencies are aroused by an intruder. Therefore the black plumage, including dark under-parts, which emphasises the difference between young and adult, may well help to inhibit, or at any rate act as a less efficient releaser of, adult aggression. This function, in a basically cliff-nesting species, would obviously be of great importance, since a dislodged youngster would usually die. The juvenile Australasian Gannet shows more white (an attack releasing property in the above argument) and also wanders more. Since they would obviously not wander if attacked in the same way as the young of North Atlantic Gannets, both properties indicate



FIG. 12. The juvenile's journey to the cliff edge, during fledging, elicits strong attack from adults and young, past whose nests it must blunder. Although almost always accomplished in seconds or minutes, this stage of the process may take hours or even days, during which the juvenile crouches between nests in the bill-hiding posture to appease attacking adults

less pronounced aggressive behaviour in adult Australasian Gannets. This is speculation, but would help to explain two otherwise puzzling differences between the races. It would not be surprising if a difference in adult aggression did occur, since the circumstances of the two widely separated races are obviously quite different.

FLEDGING BEHAVIOUR AND THE NEWLY-INDEPENDENT YOUNG
I have described fledging procedure elsewhere (Nelson 1964b). The accompanying illustrations (plate 69b, fig. 12) show the young bird preparing to leave for its first leap from the top of the cliff down to the sea. Fledging is preceded by extensive 'preparation' in which the chick concentrates on the sea, usually far below, and during which the urge to leave the nest gradually, and with many vacillations, mounts and eventually forces the chick to jump off the cliff-ledge nest or, where necessary, to flounder through attacking adults (fig. 12) to gain the cliff edge. It should be stressed that the chick does not leave because it is hungry; except in the case of very late young it has not been abandoned or even partially starved. The complete contrast between Gannets and all other members of the Sulidae with respect to parental care of young should be strongly emphasised. All boobies continue to

feed their young after these are free-flying, but the Gannet does not (see DISCUSSION).

There are very few deaths due to fledging. The chick normally flies strongly away from the colony and lands from a few hundred yards to three miles or more out to sea. Continuous observations on the routine of parents with fledged young showed that, contrary to some previous suggestions, they in no way help the chick to fledge and that they neither accompany it to sea nor go to it and feed it.

The newly-fledged juvenile Gannet's inability to rise from the surface of the water is well known (e.g. Kay 1949) and is hardly surprising in view of its untried wings and enormous fat deposits which may weigh more than 1,000 grams. The post-fledging dispersion pattern is well documented and will not be considered here, but the transition from living on fat reserves to acquiring the art of plunge-diving, though more or less a closed book, merits discussion.

DISCUSSION

The fat reserves of a newly-fledged Gannet should keep it going for roughly two to three weeks before it reaches danger point. During this period it must learn to fish. We know that even in species which care for their young after fledging the acquisition of independence is a testing process and, of course, the more highly skilled the method of hunting the more difficult is the acquisition of this ability. The dramatic mortality in Tawny Owls *Strix aluco* once the parents no longer feed the free-flying juveniles (Southern 1959) illustrates this point and indicates the task facing a young Gannet denied even the preliminary aid of post-fledging feeding. The necessary ability to associate fish-shape with food poses no problem; even if it were not innate it is almost sure to have been acquired during the period in the nest when the chick sees fish spilt or protruding from the parent's beak during an unsuccessful attempt to regurgitate. Soon after landing on the water juveniles bathe excitedly and thrust their heads under water. As in adults, this causes the nictitating membrane to pass by reflex action across the eye and so improve underwater vision. Eventually they will see a fish and perhaps attempt to snatch it, though they will almost certainly fail. At first they are extremely buoyant and unable to drive themselves beneath the water. As they become lighter and can raise themselves, their ability to penetrate will increase until the time when, able to fly properly, they can plunge in the normal way. A comparable phylogenetic process probably led to the evolution of diving in some members of the Pelecaniformes in the first place; thus American White Pelicans *Pelecanus erythrorhynchos* fish from the surface, Brown Pelicans *P. occidentalis* plunge clumsily but never properly submerge, and Gannets and boobies have become fully adapted plunge-divers.) Kay (1949) has seen adult Gannets diving from the surface

and using wings and feet to propel themselves under water in search of fish and possibly young Gannets can do this; we lack evidence on the point. Except in unusually favourable circumstances, however, one suspects that young Gannets will not succeed in catching fish in the first, water-bound stage and will, therefore, be left with a reduced period, during which they can fly and continue to metabolise reserves, in which to learn to fish adequately. Once on the wing it seems, from several scattered records of juveniles fishing in association with adults, that the dazzling plumage of the latter may well attract young birds, as it attracts other adults, to areas in which Gannets are diving. This could provide an important marker enabling young birds to locate shoals in the critical transition stages.

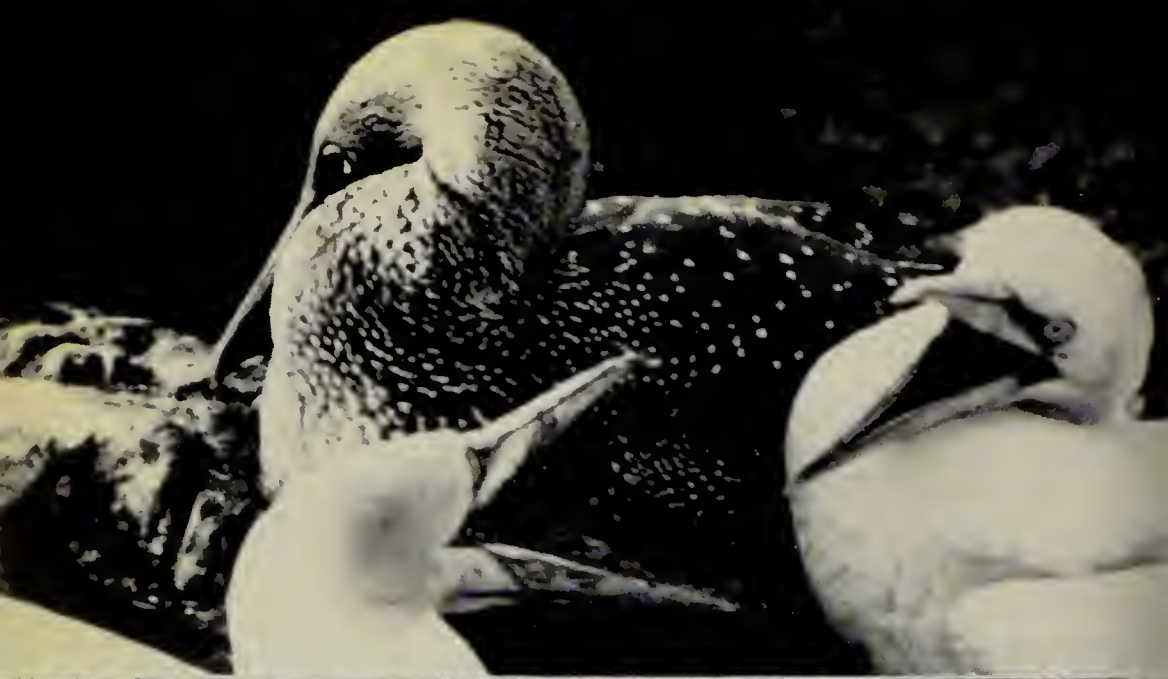
Reports by Macintyre (1950), later supported by Perry (1950), of adult Gannets feeding young at sea probably stem, as Perry realised, from the juvenile habit, once capable of flight, of pestering passing adults. I have seen single juveniles, and once a pair, pursuing adults at sea and making the chick yapping call, and in general it is by no means rare for young animals to beg indiscriminately from passing adults. However, even if an adult responds to such importuning it cannot be regarded as anything but an interesting aberration and its main significance is that it supports the surmise that such juveniles will be desperately hungry. Macintyre's supposition that records of fighting between young and adults at sea really refer to adult feeding young is quite wrong. These observations almost certainly refer to the adult Gannet's habit of attacking newly-fledged young on the water (page 403). Such young do not fight back. His assertion that adult Gannets disable fish and leave them for the less skilful young birds to pick up is fascinating but probably fanciful.

It is reasonable to suppose that the Gannet's breeding cycle is importantly influenced by the need to produce young that undergo the critical transition phase at the most favourable period. The biggest cause of mortality is post-fledging disaster, probably mainly starvation, and in a situation so fraught with difficulty the additional handicap of gales, which increase from October onwards, could hardly be other than fatal. If the favourable period is fairly prolonged, one need not expect all young to fledge in the same week or two and indeed their fledging is spread from mid-August to October, though with a clear peak in the first half of September. In this connection, it is interesting to note that the fledging period of juveniles departing in October is slightly, but statistically significantly, less than that of young leaving in September. However, another factor determining the timing of Gannet breeding is probably the period of main abundance of food fishes. The Gannet's twin habits of guarding its young and yet finding sufficient food to build up the fat reserves of its chick in a period which, compared with the rest of the family, is dramatically short, obviously



PLATE 66. Behaviour of young Gannets *Sula bassana*. Above, large young often 'attack' their parents and may elicit (left) evasive action or (right) reciprocal threat. Below left, chick preening its parent; right, chick handling piece of nest material (young Gannets carry out all adult patterns of building behaviour)







PLATES 67 and 68. Behaviour of young Gannets *Sula bassana*. Left top, 'facing-away' by chick is appeasement response to low intensity fear-eliciting stimuli (here adults menacing each other); centre, sleeping postures of adult and chick; bottom, chick inserting bill in parent's mouth (note food bulge at base of adult's neck). Above, chick's rotary head-shake (note wing-flapping, forward stretch and depression of hyoid); below, chick 'pestering' by touching adult's bill near tip



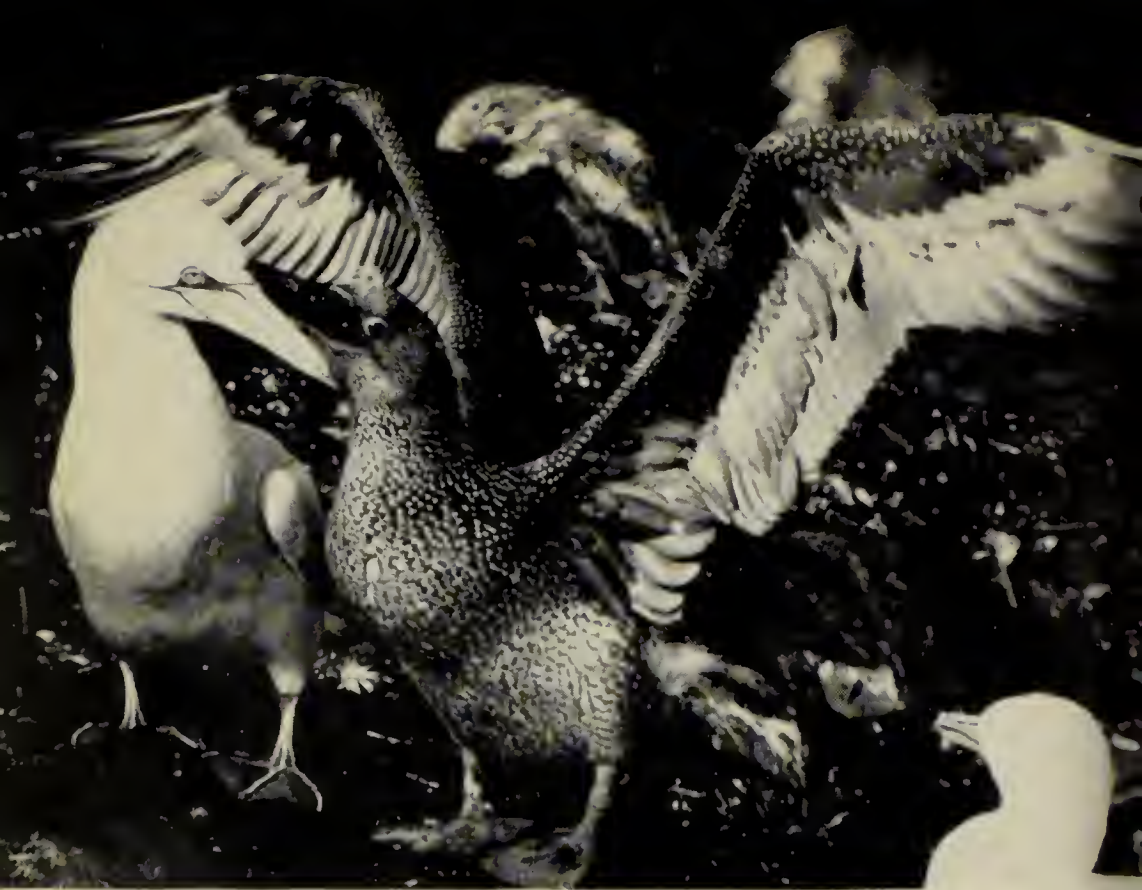


PLATE 69. Behaviour of young Gannets *Sula bassana*. Above, wing-exercising by well-grown chick; below, juvenile, having made its way to cliff edge, 'concentrating' before its first leap down into the sea. This and the other behaviour shown in these plates is described on pages 393-419 (all photos by J. B. Nelson)



requires a very rich and dependable source of food. It seems that, in order fully to exploit this, the Gannet has evolved its specifically diagnostic breeding regime, producing heavy youngsters which cannot return to the nest as boobies do.

Several lines of investigation could clarify the whole picture of survival of young in relation to various factors such as time of fledging and subsequent weather conditions. We require information on the comparative survival of young fledging at different times of the season; ringing records do not specify the age of the chick when ringed, so its date of fledging is not known, but this point is now receiving attention. Observations of juveniles at sea could indicate more precisely the time lapse between fledging and learning to fish; weights of juveniles found freshly dead could indicate the degree of starvation undergone and a detailed analysis of North Sea and North Atlantic weather conditions from September to November, together with any consistent patterns of fish movements, would also be relevant.

The points raised in this discussion of post-fledging behaviour and survival suggest that a degree of synchronisation could have survival value with respect to the timing of the critical transition to independence by the juveniles which, of course, depends on the date at which the eggs were laid. Although such factors as photoperiodicity, known to time breeding in birds, are doubtless responsible for the appropriate gonad development in Gannets, social stimulation or facilitation almost certainly helps to determine the date of laying. In my view, a consistent and reasonable interpretation of the Gannet's strong competition for sites, when there is usually plenty of available space, is that survival value attaches to the acquisition of a site with the necessary social qualities—that is, near or among an existing group, which in turn means a dense group. This survival value probably has nothing to do with safety from predation, but since social stimulation enhances synchronisation (Nelson 1966) and synchronisation may well be advantageous for the reasons given above, it may lie in getting a site with the optimal exposure to social stimulation. This argument simply suggests a biological rationale for a self-evident phenomenon—the Gannet's strong social tendency—and, in turn, for the evolution of the otherwise puzzling aggression in competition for the relatively few available sites of this nature. Whilst there is little heuristic value in simply noting the Gannet's social tendency, there is food for thought in the linkage of major behavioural and ecological systems into a consistent whole.

ACKNOWLEDGEMENTS

Before I am greatly indebted to Dr. J. M. Cullen for help and criticism in this work, and to my wife for aid in its execution. The support of the Nature Conservancy and, in the third year, the

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SUMMARY

This account describes the behaviour of the Gannet *Sula bassana* from hatching to independence, and various aspects of its relationship with its parents and other adults. The chick begins its 90-day period in the nest as a helpless youngster, but is attended unremittingly even when able to endure exposure. This is mainly to protect it from other adults, against which the chick's appeasing behaviour, bill-hiding, is only partly effective. Partly because of adult hostility, but in many cases because of its precarious cliff position, young Gannets do not wander from the nest. If young are inter-changed adults accept them even where there is a considerable difference in size. Similarly, they accept eggs in place of young and young of various ages in place of eggs. Wandering young are severely attacked, however, and adults also tend to attack their own young if these try to regain the nest after being displaced. Nevertheless, there is much variability in the nature of this response.

The appearance of various behaviour patterns during the development of the chick is described. Chick behaviour is marked by aggression to other young, but by fear of adults (except its parents) and by the development of strong appeasing behaviour. In keeping with this, threat behaviour towards adults is rare and young Gannets have not developed site ownership behaviour by the time they leave the nest.

Fledging occurs at 90 days without starvation or any interference from the parents. The young have about 1,000 grams of fat reserves. The nature and difficulties of their transition to independence are considered. It is concluded that important survival value attaches to young fledging at the most favourable period of the year, and that the production of such young partly determines the Gannet breeding season.

In the discussion an association between the aggression which was shown to be such an important factor in parent/young relations and competition for sites is suggested, the spur for the latter being the beneficial effect of synchronisation and timing of breeding rather than a limited number of topographically suitable sites.

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The effect of beech crops on Great Tit populations and movements

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INTRODUCTION

THIS PAPER is based on previous work by Ulfstrand (1962) and myself (Perrins 1965), both of whom have shown that the seed crop of beech *Fagus sylvatica* has a marked effect on the life of the Great Tit *Parus major*. I have demonstrated a strong tendency for there to be more Great Tits in a given summer than in the preceding one if there is a beech crop for the birds to feed on in the intervening winter. Ulfstrand has proved that Great Tits in Sweden feed almost exclusively on beech seed in winters when it is plentiful. When it is not plentiful, a proportion of the birds (mostly young ones) move away, some of them perhaps crossing the Skagerrak or Baltic. In the following spring, a number of these return to the areas that they left in autumn.

I want to discuss the effects of the beech on both British and Continental Great Tits. However, it is important to stress that there is no important difference between the populations of these two areas. Great Tits from at least some parts of Continental Europe undertake long-distance movements in certain conditions, but there is no evidence that the British birds do this. Possible reasons for this difference will be given in the discussion.

I do not intend to discuss in this paper the detailed movements of Great Tits (or those of Blue Tits *P. caeruleus* and Coal Tits *P. ater*, which are often associated). These have been well described by Cramp *et al.* (1960), Ulfstrand (1962) and Cramp (1963).

BEECH MAST

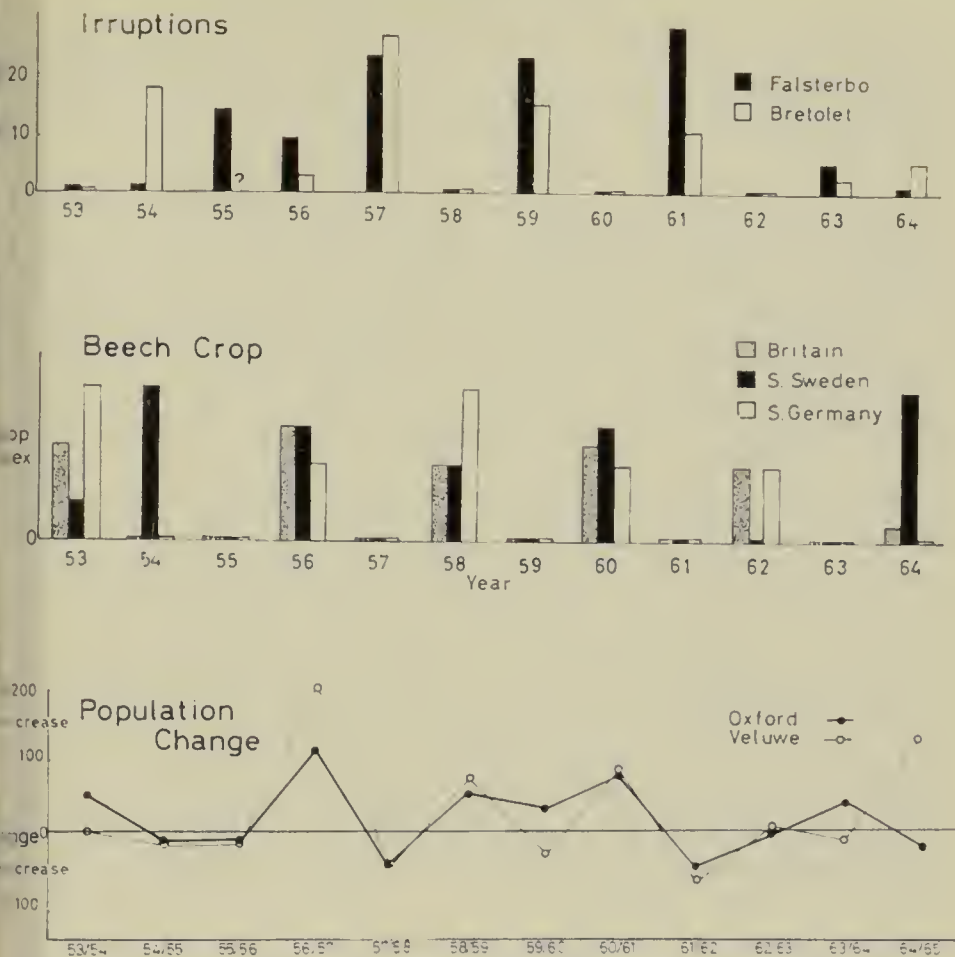
Beech is locally common in large areas of western Europe and extends northwards into southern Sweden. Mast (seed) is not normally produced annually, but irregularly at intervals of more than one year. Often, but by no means always, there is a crop in alternate years.

Typically, a warm spring and summer result in a good growth of the trees and the laying down of many flowering buds that autumn; good flowering takes place the following spring and the ensuing seed crop is produced in October/November of that year (Matthews 1963). Hence the production of a crop is initiated by fine weather in the spring 18 months earlier, but probably many other factors affect its size. Frosts in the late spring of a flowering year are known to reduce it. During the summer of a year when a good crop is being produced, it seems that most of the food supply goes into the seeds, as few flowering buds are produced and, without these, the tree cannot yield a seed crop the next year. Thus good crops cannot follow in successive years, though poor crops do. Indeed, in the last six years on the Wytham estate, near Oxford, individual trees have not produced a good crop as often as once every two years; for example, the trees which fruited well in 1960 did not produce much mast again in 1962.

It can be seen that the beech trees have both an intrinsic variation and others due to the weather. Because of the latter, the size of the crop is generally similar in different parts of Europe. The middle part of fig. 1 shows the beech crops since 1953 in southern Britain, southern Sweden and southern Germany round Unterfranken. The crops have tended to occur in the same years, even though the British and Swedish areas are 700-800 miles apart. However, there is not always a close correlation between these different areas, nor indeed between different parts of southern Britain. The main cause of the discrepancies might be a cold late spring, which has greater effects on the crops in some localities than others. It will be noticed that in certain years (1954, 1962) when the crops in some areas, but not others, failed, the areas of failure did not become out of phase with the others in later years. Possibly a cold, wet spring, which prevents proper pollination, also inhibits the formation of flowering buds, so that a crop is not formed in the next year either.

Southern Germany has not always had good crops in the same years as northern Germany and it is perhaps worth noting that there were good crops in northern Germany in 1964 when there were reasonable crops in Sweden (and Poland), but only poor ones in Britain.

BEECH CROPS AND GREAT TITS



G. 1. Irruptions and fluctuations in breeding numbers of Great Tits *Parus major* in relation to the beech crop. *Irruptions* at the Col de Bretolet are given in terms of the proportions of Great Tits to all birds other than tits trapped, multiplied by 100. Thus, if 5,000 tits were trapped, of which 2,000 were Great Tits, and also 3,000 other birds, then the irruption index would be $2,000 \times 100 \div 10,000 = 20$. The irruptions at the Falsterbo station are more subjective; they should be used only to get some idea of relative numbers seen each year. There were no observations at the Col de Bretolet in 1955. *Beech crops* are all scored differently in the various areas and have been reduced to similar scales for simplicity. These crops are also subjective—for example, those in Britain are scored from 'nil' to 'abundant' in nine categories—but the increase between one category and the next does not necessarily represent a constant increase in the quantity of seed. The crops are plotted against the autumn of the year in which the seed became available to the birds: for instance, the crop shown for 1960 was eaten by the birds in the winter of 60/61. *Fluctuations in breeding numbers* were obtained as follows. The difference between the numbers breeding in year A and year B was calculated as a percentage of the number in year A. If the population was larger in year B than year A, the percentage was plotted as an increase; if it was smaller, then as a decrease. For example, in 1960 there were 51 breeding pairs in Marley, and in 1961 86 pairs: the change was thus $+35 \times 100 \div 51 = +69\%$; this is plotted against the beech score for the autumn intervening between the two population counts (i.e. that of 1960).

(The crops shown in fig. 1 are scored in different ways in the different countries and may not be exactly comparable, but for the purpose described here the presence or absence of a crop is almost all that is needed.)

FLUCTUATIONS IN BREEDING NUMBERS

The Great Tit has perhaps been more fully studied than any other species of wild bird. The longest population study is that initiated in the Netherlands by G. Wolda in 1912 and continued by Kluijver (1951) up to the present day. Two other fairly long-term studies have been continuous in Britain since the late 1940's—one in the Forest of Dean, Gloucestershire, by Dr. Bruce Campbell, and the other in Wytham Wood, two miles west of Oxford, by a team of workers at the Edward Grey Institute under the direction of Dr. David Lack. From these and other shorter studies it is possible to make several points. First, Great Tits breed at very different densities in different woods, usually at around one pair per two acres in broad-leaved woodland, and one pair per ten to 15 acres in pine-woods. Secondly, although minor fluctuations in the breeding population have occurred in some woods and not in others, virtually all the major changes have been simultaneous in all the populations (e.g. Lack 1963, fig. 1). This means that, within limits, it can be assumed that what is happening in these small areas indicates what is happening over larger areas of western Europe. It is worth noting that most areas had abnormally high breeding populations in 1957, 1959 and 1961.

I have shown a strong positive correlation between the annual fluctuations in the tit populations in the Netherlands and the beech crop in Britain in the preceding autumn and winter, there being no data for this crop in the Netherlands in the earlier years (Perrins 1965). Numbers tended to be higher in the summer after a good crop and to be lower if there was no crop (fig. 1, bottom). Extreme caution is necessary in the interpretation of this correlation, however, since the relationship between tit numbers and beech crops is not a simple one. It is true that in Wytham the tits feed heavily on beech seed when it is present, and there can be little doubt that the seed is an important factor helping the tits to survive the winter, but there are two complications.

First, tits fluctuate similarly in areas where there is no beech (there is relatively little in the present study areas in the Netherlands). While further information is required, it seems likely that the reason for this is that, as shown for Sweden by Svårdson (1957) and Ulfstrand (1963), other tree species usually have heavy crops in the same years as the beech (presumably because they are similarly affected by the weather and by the two-year principle). Even those species (e.g. birch *Betula spp.*) which produce crops annually have better ones in the years when a

beech crop is produced. There are no comparable data for the seed crops of other trees in Britain, but Hyde (1963) has shown that many tree species produce heavy crops of pollen in the same years. Hence the correlation with the beech crop could be because the latter is correlated with other seed crops that are at least as important to the survival of the tits.

Secondly, there has tended to be a higher proportion of juveniles in the autumn population (i.e. a better survival of young) in those years when there was later a beech crop. Survival is evidently better, therefore, when there is going to be a good food supply for the birds during the winter, but before they can use it. It is true that trees such as hawthorn *Crataegus monogyna*, hazel *Corylus avellana* and privet *Ligustrum vulgare* form fruit in the same years as the beech, and that their fruits are available in August and September, but there is good reason to believe (Perrins 1965) that the critical mortality in the young tits occurs in July, before even these seeds are available. It seems very unlikely, therefore, that seed crops themselves are responsible for the late summer mortality. It is still possible, however, that some common factor affects both the beech crop and the survival of the young Great Tits. For example, the carbohydrate reserves of the trees are higher when the fruits are being formed, and aphids are found in larger numbers on those parts of the trees which are flowering. Hence it is possible that the young tits could find more animal food in those summers when seed is produced and so survive better than in barren years. But this is untested.

On average, about half the breeding Great Tits survive until the following year. Hence, if the population is to remain stable over a long period, and there are very few non-breeders, only one young from each pair survives to breed and so replaces the adult that died; all the remaining young die. In Wytham, some five to nine young fledge per pair and hence, on average, four to eight of these will be dead by the following season. The number of young present in the winter population has been measured in terms of the proportion of young to adult. This proportion has varied markedly from year to year, from as low as 0.16 young to as many as 2.0 young per adult, or 0.32 to 4.0 young per pair, in the autumn (November/December).

Hence, as in so many species of animals, many more young are produced each year than are necessary to replace the adults which die. As shown by Kluijver (1951), the production of young varies inversely with the breeding density, fewer young being produced per pair at higher densities, but, as demonstrated by Lack (1964), the changes in the breeding population are not affected by the numbers of fledged young raised. Hence, within limits, the production rate is not an important factor affecting the subsequent changes in breeding numbers. What does closely affect the changes in breeding numbers is the pro-

portion of these young which survive to the autumn (Perrins 1963 and fig. 2). When large numbers survive, there is an increase in the breeding population; when lower numbers do so, a decrease.

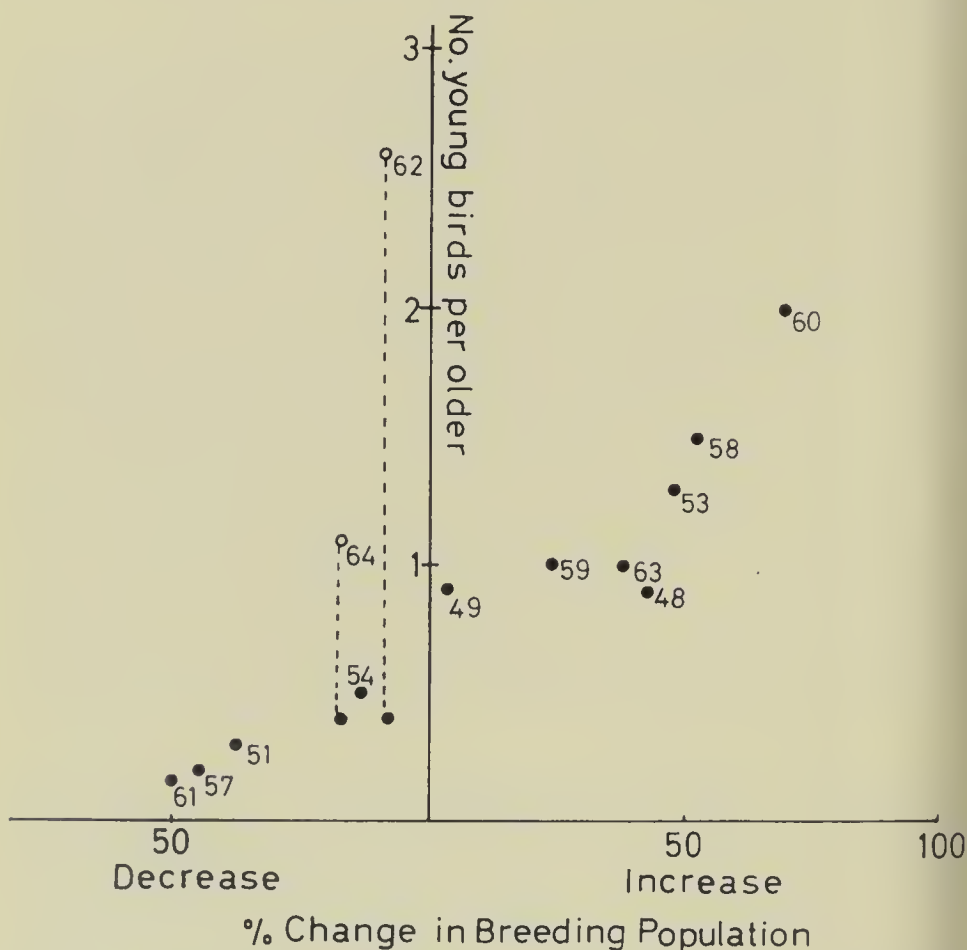


FIG. 2. Ratio of young Great Tits *Parus major* to older ones in relation to the percentage change in the breeding population the following year. The percentage change was calculated as in fig. 1. In most years there did not seem to be much change between the ratio at the beginning of the autumn and that at the end of the winter. In some recent years, however, when there was a rich crop of beech mast (1960, 1962 and 1964), it was difficult to catch the birds in the standard way at bait, and the majority were caught while feeding under the beech trees. A very high proportion of young are found in these conditions, apparently because they travel further than the older ones to feed on the seed. For 1960, therefore, the figures for those trapped in Marley (away from beech) have been used. In 1962 and 1964 there was a large loss during the winter and two points are shown for each, one for the autumn and the other for the spring breeding population. In the severe winter of 1962/63 many of the large number of young tits present in the autumn died. The winter of 1964/65 was unusual in that there was, in Wytham, a small amount of beech mast on a few trees and many tits, again mostly young ones, gathered at these to feed; apparently they consumed it all as they stopped feeding there at the end of December 1964.

BEECH CROPS AND GREAT TITS

Table 1. Proportion of young Great Tits *Parus major* leaving the Wytham estate, near Oxford, each year

The list of years is not complete because no data are available on age ratios in the autumns of 1950, 1952, 1955 and 1956. Taking together the years when the autumn ratio was 0.9 or larger, 0.91% of the young ringed were recovered outside the wood: in the years when it was 0.5 or smaller, however, only 0.65% were recovered outside. In 1962 and 1964, when there seemed to be a large winter loss of young and the autumn ratios (of 2.6 and 1.1 respectively) dropped to 0.4 by the spring in each case, the recovery rate outside was as low as 0.30% (see note to fig. 2)

Year	Number ringed	Number recovered outside wood	Number of juveniles per older bird in autumn
1948	367	4	0.9
1949	477	7	0.9
1951	157	0	0.3
1953	184	1	1.3
1954	262	2	0.5
1957	225	2	0.2
1958	357	2	1.5
1959	843	6	1.0
1960	767	8	2.0
1961	1,349	11	0.2
1962	1,000	4	2.6
1963	1,279	11	1.0
1964	992	2	1.1

The marked variations in the loss of young between summer and autumn in different years are not due to emigration from Wytham. Table 1 shows that the percentage of young recovered outside the wood was slightly lower in years when there were few left in the wood than in years when many were left there. Further, as I have demonstrated elsewhere (Perrins 1963), the young which survive to autumn are those which were heavier as nestlings, while the lighter nestlings disappear. But the birds recovered outside the wood were heavy as chicks and therefore do not represent the large number of missing, lighter young.

Present knowledge does not warrant further speculation. All that can be said is that there are larger numbers of breeding Great Tits after winter with beech mast than before, due to a higher survival of young in the preceding late summer and probably also a higher survival of adults and young in the winter.

Finally, because high numbers of tits are found after years with a beech crop, and because beech crops do not occur in successive years, there is a strong tendency for there to be a high breeding population before an autumn of crop failure, and a low breeding population before an autumn with a crop. This is an important point, first made by Birdson (1957) though not in connection with tit species. Hence it

is very difficult to establish whether high density or (probable) food shortage is responsible for the disappearance of more young in some summer/autumn periods than others.

ERUPTIONS

Some striking movements of Great Tits (usually with Blue Tits and sometimes Coal Tits) have been observed in western Europe, particularly in recent years. One of the most spectacular was that in the autumn of 1957 (Cramp *et al.* 1960). Ringing returns for that year show that unusually large numbers of tits invaded Britain from the Continent, and also that a proportion of the invaders returned to the Continent in the following spring. There is, however, no evidence from ringing that British Great Tits were moving abnormally long distances in that or in any of the other years when wide-scale movements were recorded on the Continent.

The tendency first noticed by Ulfstrand (1962) for Great Tits to move in years when the beech crop failed has also held good in later years. Fig. 1 (top) shows numbers of Great Tits passing through Falsterbo, in southern Sweden, and, in addition, those at the Col de Bretolet, Switzerland. The evidence supports Ulfstrand's findings in that there was much more movement in the years when the beech crop was poor than in the years in which it was good.

As pointed out above, there is a tendency for high breeding populations to occur in the summers before a crop failure and it is therefore difficult to determine whether eruptions are initiated through food shortage or through high densities which cause much territorial aggression in autumn (Kluyver 1951). In 1954, however, there was a good beech crop in southern Sweden, but not in other areas, and the Great Tits of the various areas, although probably at comparable densities in all cases, behaved differently. There were negligible movements at Falsterbo, but considerable ones at the Col de Bretolet; although the place of origin of those at the latter locality is not well known, presumably many of them came from Switzerland and southern Germany. Neither of these areas had beech crops in that autumn. Something similar may have occurred in 1964, though the evidence is less clear. In that year there were good beech crops in Sweden, northern Germany and Poland, but not in Britain or southern Germany. Very few Great Tits were observed at Falsterbo, but a small number passed the Col de Bretolet. Hence, though data are needed for many more years to corroborate this, it seems that, at least in one year and perhaps in two, food shortage and not population density was the primary factor affecting the movement of the birds.

It is also possible that a high breeding density does not necessarily mean a high population in the autumn and winter. As mentioned earlier, the ratio of juveniles per older bird in winter varies markedly

BEECH CROPS AND GREAT TITS

Table 2. Estimated autumn populations of Great Tits *Parus major* in Marley Wood, Wytham, near Oxford, 1957-64

Autumn populations were estimated by doubling the number of breeding pairs (to give the number of adults) and then adding a figure for juveniles on the basis of the autumn age ratio. Thus, in 1960 the 51 breeding pairs were taken to equal 102 adults; that year there were 2.0 juveniles per older bird in autumn and so the number of juveniles was calculated as 204; the total population was therefore put at 306. This assumes that adult mortality is nil between the breeding season and the autumn; that is not so, of course, but the evidence suggests that mortality is small at this time and, more important, relatively constant. Therefore, although the total numbers will have been overestimated, the figures are thought to be comparable with each other. The beech crops were scored from 'nil' to 'abundant' in nine categories (see note to fig. 1)

Year	Number of breeding pairs	Number of juveniles per older bird in autumn	Estimated total number	Eruptions	Beech crop
1957	49	0.2	118	Large	0
1958	27	1.5	135	Very small	4
1959	41	1.0	164	Large	0
1960	51	2.0	306	Very small	5
1961	86	0.2	206	Large	0
1962	43	2.6	312	Very small	4
1963	39	1.0	156	Small	0
1964	54	1.1	227	Small	1-2

from year to year, and tends to be higher in the years when there is a beech crop. This figure and that for the previous breeding population can be used to obtain an estimate of the number of birds present in the population in the autumn (table 2). From this it can be seen that, at least in the years studied, there have been more birds in the Wytham population in the autumns when no movements were recorded on the Continent than in those when movements were recorded. (It will be remembered that there is no evidence to show more local wanderings in the years of Wytham high breeding density.) Since the Continental populations tend to fluctuate in parallel with that in Wytham, it seems likely that eruptions do not occur at high densities, but in years when the seed crops have failed.

DISCUSSION

The arguments put forward above are necessarily speculative to some extent, since the quantitative measurement of eruptions is exceedingly difficult and data for many more years, with further information on other factors likely to be involved, would be necessary for a proper analysis. The difficulty of ascertaining the exact role of the beech crop has already been mentioned, but in certain years varying weather across Europe may also affect the size of the crop and this would mean

that large movements might be seen in some areas, but be small or absent in others. This probably happened in 1963 and 1964 and may have accounted for the small movements observed. For example, as mentioned earlier, in 1964 the crops were reasonably large in northern Germany, Poland and Sweden, but not in southern Germany or Britain; the British breeding population dropped, the Dutch one rose, and there was relatively more movement in Switzerland than Sweden, but the differences were not clear-cut. Further, it would be useful to know more about the breeding populations and the early autumn numbers in other areas as well. It is difficult, for example, to say whether the fact that three times as many birds as usual are seen passing a given place in autumn is due to a high proportion emigrating from a small or normal population or to a very low proportion emigrating from an abnormally high population. Hence the movements seen in 1963 and 1964 may have been proportionately larger than they appear in fig. 1, since the numbers of breeding Great Tits in these years were much smaller than in 1961.

It would also be of great interest to know the respective survival rates of the young birds which emigrated and those which remained behind. Wynne-Edwards (1962) has followed certain earlier workers in maintaining that birds moving in an eruption are a doomed surplus of the population. This is contrary to the evidence of others summarised by Lack (1954); Svårdson (1957) also demonstrated that for many species, such as the Siskin *Carduelis spinus*, Crossbill *Loxia curvirostra*, Waxwing *Bombycilla garrulus* and Fieldfare *Turdus pilaris*, the emigrating population was not necessarily doomed. These species move out of areas when the food supply fails and roam until they find an area with a better food supply. Certainly there may be a high mortality in these circumstances, but there would clearly be a high mortality if the birds remained behind in an area where the food supplies had failed.

Unfortunately, it is impossible to measure the differences in mortality resulting from these alternatives, but eruptive movements could have been evolved through natural selection only if those birds which emigrated have, on average, survived better than they would have done if they had stayed behind. Cramp *et al.* (1960, e.g. fig. 10) provided clear evidence that, after the 1957 irruption of Blue and Great Tits into Britain from the Continent, there was a reverse movement back to the Continent in the spring of 1958. Therefore, at least a proportion of the erupting birds survived.

Not only are there variations between the numbers of Great Tits moving in different years, but, as in other eruptive species, there are also tendencies for more young than old birds to move, as well as higher proportions of the more easterly and northerly populations than of the more southerly and westerly ones. The reason for the former is probably that suggested by Kalela (1954 in Ulfstrand 1962) and by

Laek (1954), namely that the young birds are less likely than their parents to survive in the area where they were bred (survival of young birds is lower than that of adults); hence they are more likely to benefit by going elsewhere and therefore more of them do so.

The proportion of the Great Tit population which moves varies from all individuals emigrating out of northern Russia every year and virtually none doing so from Britain. In the former case it seems probable that the daylight is so short in mid-winter and the winter itself so severe that the birds are forced to move south and west every year, while those in less rigorous regions do so only when the food supply fails. When these birds move south and west they have a chance not only of finding more food, but of needing less to maintain their body temperature because they have moved into an area with a milder climate. This possibly helps to explain why the British population is sedentary; there are only relatively small areas to the south and west and these are poorly wooded.

Eruptions have sometimes been explained as the result of mounting aggression between individuals at high densities causing many birds to emigrate (Kluyver 1951). Following this argument it is difficult to see the advantage in emigrating from areas with a high population since, already stressed, all populations tend to be high in the same years. Further, at least some of the survivors return to the general vicinity of their birth-place after the winter and so do not leave permanently. However, Laek (1954) has suggested that high densities might be used by the birds as an indicator of impending food shortage. Since, as shown above, high densities of tits are associated with poor food supplies, such a reaction might be doubly important and the tits might find it advantageous in these circumstances to go elsewhere, not in search of lower densities of birds, but in search of larger supplies of food, milder climates, or longer days for finding food in mid-winter. Svårdson (1957) put forward the alternative view that the so-called eruptive species are, in fact, true migrants which migrate in highly variable numbers depending on the food supply. That this might also be true for the Great Tit is suggested by Ulfstrand's observations that some years Great Tits moved into the beech areas of southern Sweden in large numbers. It seems most probable that these were birds which had lived in northern Scandinavia, north of the areas containing beech, and that when their food supplies had failed they had 'migrated' south until they met with rich supplies of food; having done so, they moved no further. Laek (1966) agreed with Svårdson. I personally favour Svårdson's view for the Great Tit since, as shown earlier, I think that the populations in Wytham may not be unduly high in the autumns when movements occur elsewhere. There is also the slight supporting evidence of the data for 1954 when good crops were obtained in Sweden, but not further south, and the Great Tits in Sweden

did not move while the others did.

Finally, I should like to make two very speculative suggestions. Firstly, as stressed by Svårdson (1957), many of the factors affecting eruptive movements are more likely to be solved by the botanist rather than the ornithologist. Svårdson demonstrated that many of the Swedish tree species had the same intrinsic rhythm as that shown here for the beech, namely that the trees showed 'tiredness' after a year of fruiting and did not produce a seed crop in the following year. Apart from tits, many species of animals—for example, Bullfinches *Pyrrhula pyrrhula* (Newton 1964) and some small mammals (Turček 1955)—are known to survive the winter in larger numbers if there is abundant food. If the trees produced a crop of seed every year, then it seems likely that the seed- and fruit-eating animals would be generally more abundant. From the evolutionary viewpoint of the trees it is essential that the seeds be left to germinate. I think it possible that, if a tree is able to store its nutrients and produce seeds every other year (as opposed to, say, half as many seeds every year), more seeds may survive to germinate. By doing this, the trees are, in effect, starving the 'predators' of their seeds (and thereby reducing their numbers) in one year, and then providing so much seed in the alternate year that the reduced number of animals cannot consume them all. I suggest, therefore, that the intrinsic rhythm in fruiting is an adaptation evolved in response to predation. This, together with extrinsic factors such as bad weather, largely controls the periodicity of fruiting. Similar suggestions have been made by Elton (1924), Svårdson (1957) and Watt (1923), who have shown that up to 100% of the beech seed is eaten by mice and birds in years when there is a poor crop. In years of a good crop, however, over 50% of the seed may be left at the end of the winter and good germination may follow.

Secondly, I should like to suggest that irruptions of Great Tits into Britain, or western Europe, might possibly become more common. In times past, those which moved into western Europe would have found conditions only slightly better than in the areas which they left, since food failures are apt to occur over wide areas simultaneously. However, there is some evidence that, over recent years, the breeding numbers of Great Tits in Wytham are increasing. If so, the reason is probably because, in winters of food shortage, the birds leave the wood daily and visit urban areas to feed on bird tables. Several catches of a hundred or more Blue and Great Tits have been made at a single bird table in one morning in the Oxford area. If the winter survival-rate of these resident birds has increased, then that of the immigrants will have also. It seems likely, therefore, that the advantage to the high latitude birds of coming to areas of dense human population may have increased. This is particularly true of those areas where, as in Britain, the winter feeding of birds is carried out on a large scale.

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It will be clear that this paper could not have been written without the help of the many people who provided the essential information.

I am especially indebted to Dr. J. D. Matthews of the Forestry Commission for supplying data on the British beech crops and information about the factors controlling fruiting. G. Buszewicz supplied me with the British data for the years 1963 and 1964, and Dr. E. von Maurer provided information on the beech crops in Germany. Dr. S. Ulfstrand supplied me with the data both for the beech crops in Sweden and the movements of tits for the years since his main paper in 1962. Dr. A. Schifferli supplied the data for the Col de Bretolet. Dr. H. N. Kluijver and H. van Balen gave me the information for the Dutch breeding populations and Dr. Bruce Campbell that for the Forest of Dean.

Dr. David Lack and Dr. I. Newton kindly read and criticised the manuscript.

SUMMARY

The irregular fruiting habits of the beech *Fagus sylvatica* are discussed. It is shown that populations of the Great Tit *Parus major* fluctuate in relation to the amount of beech seed. Since there is no beech in some of the areas where Great Tits have been studied the connection cannot be direct, but it seems likely that the beech crop indicates the general level of food abundance.

As shown by Ulfstrand (1962), there is a strong tendency for large movements of Great Tits to be recorded in those years when there is no beech crop. It is suggested (though the data are insufficient to provide full proof) that Great Tits show eruptive movements not because of high population density but because of food shortage.

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Notes

Mute Swan taking over broods of Shelducks.—On the evening of 7th July 1966, on the shore of Bewan Loch, North Ronaldsay, Orkney, I disturbed a female Shelduck *Tadorna tadorna* with a brood of seven young. As the family took to the water in a hurry, a Mute Swan *Cygnus olor* which had been feeding about 20 yards away suddenly rushed towards me hissing with its wings raised. I retreated hastily and it then turned on the female Shelduck, forcing her to take wing and attacking her with such vigour when she landed again that she was left partly stunned in the water. After this, the swan swam round the seven ducklings and moved off to the other side of the loch with them following. Three hours later I returned and found the young Shelducks still with the swan. This Mute Swan had been on the loch for about two months by itself and during that time there had been ducklings of various species without any similar behaviour being noted.

In the next week there were continuous skirmishes between the Mute Swan and both adult Shelducks, the male now having joined his mate. The two ducks made repeated attempts at getting back their seven young, but each time the swan managed to drive them off until eventually the Shelducks gave up and all was quiet for two days. Then another pair of Shelducks arrived on the loch with six young and, though I did not see it myself, I was told that there followed another battle in which the swan was again successful. At any rate, the next time I passed, the swan was accompanied by 13 young Shelducks. The second pair of Shelducks made little attempt to retrieve their young, but stayed at the other end of the loch. The climax came on

both July when a pair of Mute Swans arrived on the loch with four cygnets. The uproar which followed attracted my attention 400 yards away. I am not sure how it began, but it ended with the single swan being driven off the loch. For six days the young Shelducks tended for themselves and then, on 26th July, they left the loch and joined up with another brood on the seashore. The single swan had not returned by 28th July when I went away. KENNETH WALKER

Buzzard stooping at healthy lamb.—On 26th April 1966, on Ramsey Island, Pembrokeshire, I was watching a pair of Buzzards *Buteo buteo* soaring overhead when a third one flew in from the mainland. The resident male repeatedly attacked the intruder, driving it to the ground on two occasions before it eventually made off. The male Buzzard then stooped at a Rabbit *Oryctolagus cuniculus*, missed it and afterwards soared in spirals to such a height that he appeared only a dot through binoculars. Then he suddenly dropped out of the sky towards a four-day-old lamb standing in the middle of the field in front of me. The lamb, which was quite healthy and not sick or injured in any way, moved at the last moment and the Buzzard hit the ground where it had been. He took off again, rejoined his mate which had remained soaring at a height of 40-50 feet throughout, and together they flew off.

RICHARD A. STRATON

[Birds of prey of many species not infrequently make mock attacks on other birds and mammals in a variety of circumstances—for example, when their eyrie is being disturbed by man or when an attack on a normal prey species has been unsuccessful. In this case the territorial encounter with the intruding Buzzard seems to have stimulated the stoops on the Rabbit and the lamb.—Eds.]

Feeding association of seabirds with Basking Sharks.—The following observations were made around the Lizard peninsula, Cornwall, in 1963. The weather was generally sunny with strong south-east winds making white tops to the waves.

On the morning of 31st May, just south of Mullion, I was watching a Basking Shark *Cetorhinus maximus* when a Razorbill *Alca torda* came flying down the coast and, landing on the water close by the shark's dorsal fins, began swimming round. On 2nd June I saw at least four of these sharks just below the surface in the bay between Lizard Point and Cadgwith; six Herring Gulls *Larus argentatus* were settled on the water within a foot or two of one large dorsal fin, occasionally flying over and almost landing on the fin as they followed the moving shark. Over that day I made a number of further observations. A Guillemot *Uria aalge* was seen diving within a few feet of a shark and periodically coming on to keep up with it, while a Lesser Black-backed Gull *L. fuscus*

hovered overhead. Next I watched a Shag *Phalacrocorax aristotelis* diving a few yards from another shark. Two Gannets *Sula bassana* circled over four sharks in Cadgwith Bay for 15 minutes and one of them was seen to plunge down into the water. Finally, a party of ten Herring Gulls were fluttering and settling on the sea around several of these sharks and a Great Black-backed Gull *L. marinus* landed on the water a few feet from a dorsal fin.

These large, slow-moving fish which swim close to the surface with dorsal fins exposed are evidently a focus for feeding activity by a variety of seabirds.

R. ANGLES

'Raptor-flight' of Cuckoo.—With reference to the paper by Dr. J. S. Ash and the subsequent letters by Hubert E. Pounds and Dr. A. P. Radford on the 'raptor-flight' of the Cuckoo *Cuculus canorus* (*Brit. Birds*, 58: 1-5, 154-155), I write to record some observations which I made between 18.20 and 18.45 BST on 13th June 1966, at Round Down, near South Harting, Sussex, in dry and sunny weather with little cloud and light wind.

I saw a bird flying back and forth over an area about 100 yards by 50 yards in extent. It was at a height of six to ten feet above the ground with occasional towering to about 30-50 feet. It had quite a fast flight when towering, but at other times was slow and almost hovering like a bird of prey. In fact, at first I thought it was possibly a Kestrel *Falco tinnunculus* or a Sparrowhawk *Accipiter nisus*. On several occasions, however, it flew up into a large, bushy yew and perched for a minute or so on the topmost branches. Looking through binoculars then from about 250-300 yards, I could see that it was clearly a Cuckoo and yet it still resembled a predator, with its wings held slightly away from and a little above its body (not drooped as is often the case with a Cuckoo); its head also looked hawklike as it appeared to be scanning the ground.

Each time it left the perch, it would fly upwards with a few quick wing-beats and then glide and soar over the ground, slowly losing height. It once flew right away out of sight over the ridge, but returned within three or four minutes. I did not see it come down on the ground at any time and I heard no call, though this was perhaps not surprising at that distance.

G. R. GERVIS

Reactions of feeding Skylarks and Snipe to adverse weather.—On 22nd January 1963, at Beddington sewage-farm, Surrey, I was watching a small party of a dozen or so Skylarks *Alauda arvensis* feeding among coarse tussocks of grass when a snowstorm began in a driving wind. Each of the Skylarks then assumed a position on the lee side of a grass clump, one bird to a tussock. Each faced the centre of its tussock, shuffling its feathers once or twice a minute and thus preventing the snowflakes from settling; several of them carried on occasional feeding

movements. This behaviour continued for about five minutes until the snow stopped, whereupon normal feeding was resumed.

On 16th March 1965 some Snipe *Gallinago gallinago* were feeding in a wet field at the same locality. A heavy rainstorm began and, as is usual then, a few of them took flight. Several minutes later the rain turned to hail and one Snipe in the centre of the field flew straight and low about 18 inches above the ground to the edge of the field and plunged into the thick foliage at the base of a thorn hedge. The hail changed back into rain after about three minutes and, from my position in the car almost end-on to the hedge, I saw this Snipe emerge from the opposite side of the hedge, stand on a path preening for several minutes and then fly off.

ALAN D. PROWSE

Swallows mobbing Pipistrelle Bat.—On 17th August 1966, at 3 p.m. on a sunny afternoon, I watched some Swallows *Hirundo rustica* chasing a Pipistrelle Bat *Pipistrellus pipistrellus* round a large chimney at Greensted Hall, Ongar, Essex. They chased it out of sight over the ridge of the roof, but presently it returned only to be pursued and driven away again. I distinctly had the impression that it was endeavouring to get back to the shelter of the chimney. MICHAEL TUGENDHAT

Song Thrush imitating Blackbird.—Every day in March 1966 a Song Thrush *Turdus philomelos* and a Blackbird *T. merula* sang continuously near my home in Reading, Berkshire, until at least 08.00 hours. At 0.600 on the 31st I was watching the Song Thrush on its usual perch on the topmost branch of a pear tree when I became aware of a change in its song. Instead of the normal repeated phrases, it began to sing in the manner of a Blackbird, using the clear fluty warble of that species and seldom repeating itself. After about half a minute it reverted to its normal song, but during the next half-hour switched to the Blackbird pattern about three more times. The Blackbird was not actually singing when the Song Thrush began its apparent mimicry, but it started up at about 06.15 hours. This is the first time I have recorded mimicry by any species of thrush in fifteen years of watching birds and, so far as I know, it did not repeat the imitation after that one morning.

PETER R. BLACKFORD

News and comment

Edited by J. L. F. Parslow

Bird protection in Northern Ireland.—One unfortunate and largely undesirable feature of the current boom in nature conservation has been the rapid increase in the number of different organisations, connected in one way or another with preserva-

tion of wildlife or the countryside, that have mushroomed in recent years. Year by year the situation becomes more chaotic as new societies come into being at all levels, while even organisations originally formed for quite separate purposes now clamour to climb on the conservation bandwagon. Already there is probably no one person who is in a position to name—let alone define the aims of—all those bodies now in existence that have ‘conservation’ as one of their themes. All too infrequently do we hear of the amalgamation of two bodies having similar aims, yet in many cases this is clearly just what should be done.

One such merger announced recently reflects credit on all concerned, particularly on the more junior of the two bodies because that loses its identity. After being in existence for 44 years, the Ulster Society for the Protection of Birds has now joined forces with the Royal Society for the Protection of Birds. This commendable and sensible move must certainly lead to a strengthened bird conservation movement in Northern Ireland. Frank Hamilton, a member of the R.S.P.B.’s headquarters staff for eight years, has been appointed to take charge of the society’s affairs in Northern Ireland. He will be based in Belfast at the National Trust’s offices (82 Dublin Street) and will work in close co-operation with that body and with the Irish Birds’ Protection Society. It is hoped that a rapid expansion in conservation activity will follow, and that bird reserves can soon be established.

In this last connection, it is of interest to note that several well known ornithologists and naturalists are among those members of the Nature Reserves Committee appointed recently under the Amenities Lands Act by the Ulster Minister for Development. This committee will advise the ministry on the establishment of nature reserves and on the designation of areas of scientific interest requiring special planning control.

International seabird committee formed.—Seabirds are very much in vogue among ornithologists at the present time and, due largely to the enthusiasm of Dr. W. R. P. Bourne, everything to do with them is rapidly becoming highly organised. Following the establishment of the national body known as the Seabird Group (see *Brit. Birds*, 58: 447; and 59: 164), an international committee to organise world-wide liaison work on seabirds has now been set up within the framework of the International Ornithological Committee. Initially, the new committee will be trying to rally support from national and international institutions with a view to starting an international programme of seabird studies, including a scheme for automatic data processing of all records of birds at sea. The members of the International Seabird Committee are Professor V. C. Wynne-Edwards (Chairman), Dr. R. A. Falla, Dr. F. Goethe, C. Jouanin, Dr. N. H. Kuroda, Professor K. H. Voous and Dr. G. E. Watson, with Dr. Bourne as honorary secretary. A newsletter reporting progress will be circulated to those interested, who should contact the International Seabird Committee, c/o 70 Ashby Road East, Stanhope Brctby, Burton-on-Trent, Staffordshire.

Further prizes offered for ‘Bird Study’ papers.—Two more cash prizes may be competed for by contributors of papers to *Bird Study*, the journal of the British Trust for Ornithology. These are in addition to the ‘Jonathan Sparrow Memorial Prize’ (*Brit. Birds*, 59: 320), but, unlike the latter, competitors for these new prizes need not necessarily be members of the B.T.O. The first is to be known as the ‘Stephen Boddy Memorial Prize’, and is to take the form of an annual cash award, to be made for a paper to be read at a meeting of the B.T.O. and published in *Bird Study*. Papers may concern any aspect of ornithology, but, to qualify, they should be the work of one or more amateur ornithologists, or of one or more professional ornithologists working in a wholly amateur capacity. Cash for the prize is to be derived from the income arising from Stephen Boddy’s £500 legacy to the Trust.

The second award, a one-time cash prize of £50, has been offered by a Trust member, J. J. Stonborough, for the most significant paper dealing primarily with the ecological aspects of long-distance migration to be offered to *Bird Study* within the next 18 months. This award is open to all ornithologists, whether amateur or professional. An additional prize of £10 may be awarded to the best entry by a competitor under 21 years of age.

Competition success for British bird-photographer.—In March (*Brit. Birds*, 59: 123-124) we publicised an international competition and exhibition of nature photographs to be held in Lisbon in June 1966. We now learn that the cup and cash prize for the best exhibit in the whole competition has been awarded to a British photographer, M. D. England, for his studies of Hen Harrier, Crane and Black-winged Kite. Mr. England's fine series of plates of the last two species, as well as many others, have already appeared in *British Birds*. Many of his most memorable recent photographs, including those of the Great Bustard published in an earlier number of this volume, were taken in Portugal, and it seems fitting that he should have enjoyed such success in a competition held in that country.

Peter Davis leaves the B.T.O. to take up Welsh post.—Peter Davis, Migration Research Officer of the British Trust for Ornithology since 1963, has left the Trust to take up a post with the Nature Conservancy at Cors Tregaron in mid-Wales, as Warden Naturalist responsible for reserves in Cardiganshire and neighbouring areas. Everyone concerned with the B.T.O., and particularly observatory workers for whom he was their main link with the Trust, will be sorry to hear of his departure. But, after a lifetime spent mostly on field work as warden of three island bird observatories—Lundy, Skokholm and then Fair Isle—no-one will begrudge him this opportunity of returning from an office desk to what must be his more natural environment. It is not yet known what arrangements will be made by the B.T.O. for continuation of the work with migration records from the bird observatories.

The late D. D. Harber.—The death of D. D. Harber on 30th August, following a serious operation, has come as a great shock to all who knew him personally or by correspondence. Rare birds were his *métier*, and his presence among that group of bird-watchers that collect at one place or another in southern England whenever an extreme rarity makes its appearance will be sadly missed. When it came to the identification of rare birds he was never one to suffer fools gladly; and a fool in his definition probably covered many of the bird-watchers in this country. He remained a controversial figure to the end. But even the most severe of his critics will feel a deep sense of loss at the death of someone who, it can fairly be claimed, had become a legend in his own lifetime. An obituary is to be published in a later issue of this journal.

Recent reports

By I. J. Ferguson-Lees

(These are largely unchecked reports, not authenticated records)

This summary is mainly concerned with September and October, but includes some August records received too late for the previous one (*Brit. Birds*, 59: 349-352), with which there is thus a considerable overlap, and also a few November observations.

BRITISH BIRDS

TRANSATLANTIC VAGRANTS

A number of American waders were given in the previous summary (59: 351) and it continued to be an outstanding autumn for transatlantic vagrants. A few more **Pectoral Sandpipers** *Calidris melanotos* were reported in various parts of southern England and Ireland, the latest at Wisbech sewage-farm (Lincoln/Norfolk) into November; also one on Fair Isle and two at Virkie (Shetland) in September. To the three **Baird's Sandpipers** *C. bairdii* already mentioned should be added one on St. Agnes (Isles of Scilly) during 19th-28th September. Three more **White-rumped Sandpipers** *C. fuscicollis* were seen in Co. Kerry on 8th September, on Tresco (Isles of Scilly) from 10th to 16th September and at Minsmere (Suffolk), the second of the autumn there, on 20th October. There were no additional reports of **Lesser Yellowlegs** *Tringa flavipes*, **Wilson's Phalarope** *Phalaropus tricolor*, **Solitary Sandpiper** *Tringa solitaria* or **Least Sandpiper** *Calidris minutilla*, apart from those already mentioned, but a **Long-billed Dowitcher** *Limnodromus scolopaceus* was seen on St. Agnes on 23rd October and a **Short-billed Dowitcher** *L. griseus* on the Hayle Estuary (Cornwall) from the 30th into November. There were two more **Buff-breasted Sandpipers** *Tryngites subruficollis* in Co. Wexford and Co. Mayo in September and a second **Lesser Golden Plover** *Pluvialis dominica* in Co. Cork, this time near Cork City (one of each of these two species were also trapped in the same net on Ushant, France, in mid-September). Two more **Semipalmated Sandpipers** *Calidris pusilla* were identified, at Wisbech sewage-farm in the middle of October and in Co. Cork; and two **Spotted Sandpipers** *Tringa macularia* on Tresco and St. Agnes during September. In Ireland some 27 American waders of eight species had been reported by late October.

In addition, an immature **Bonaparte's Gull** *Larus philadelphia* was seen at Hilbre (Cheshire) on 18th September and the eleven days from 6th October produced a total of four American passerines. First, an immature **Red-eyed Vireo** *Vireo olivaceus* and a female **Rose-breasted Grosbeak** *Pheucticus ludovicianus* were trapped on St. Agnes on 6th October (the latter staying until the 11th). Then a **Baltimore Oriole** *Icterus galbula* was found on Gwennap Head (Cornwall) on the 15th, and a **Parula Warbler** *Parula americana* on Tresco on the 16th and 17th. The last has not previously been recorded in the British Isles though it has occurred in Iceland. Incidentally, an American **Rufous-sided Towhee** *Pipilo erythrophthalmus* was trapped on Lundy (Devon) on 7th June, two days before a **Spanish Sparrow** *Passer hispaniolensis*, both these species also being new to Britain.

Birds which may have come across the Atlantic or from elsewhere in the Arctic included a **King Eider** *Somateria spectabilis* at Sunburch (Shetland) from 6th to 9th September and the usual scattering of **Sabine's Gulls** *Larus sabini* in the south-west (Cornwall, Scilly, Co. Cork) and on the east coast (Northumberland, Durham and Yorkshire) between 26th August and 19th October.

As we went to press in November, two more American birds reported were a drake **Blue-winged Teal** *Anas discors* on North Ronaldsay (Orkney) on 10th November and a **Brown Thrasher** *Toxostoma rufum* on Durlston Head, near Swanage (Dorset) from the 18th. Like the Parula Warbler (and the towhee), the latter has not before been seen in Britain, though there is an old Heligoland record for 1836.

EASTERN VAGRANTS

It seems to have been a poor autumn for **Yellow-browed Warblers** *Phylloscopus inornatus*. Apart from a total of five individuals on Fair Isle on 28th-29th September, only nine others were reported between late September and 17th November, in Northumberland (two), Yorkshire, Norfolk, Sussex, Cornwall and Co. Cork (three). **Pallas's Warbler** *P. proregulus*, on the other hand, which has been appearing with increasing frequency in recent years, produced another three records—at Fair Isle on 11th October, St. Agnes on the 30th and Minsmere on 4th Novem-

r. Minsmere also had two separate occurrences of another Siberian warbler, **Adams's Warbler** *P. schwarzi*, on 15th and 20th October to bring the total of British records to seven. Other eastern warblers, though perhaps of east European rather than Asiatic origin, included an **Arctic Warbler** *P. borealis* at Spurn on 12th October, **Greenish Warbler** *P. trochiloides* at St. Abb's Head (Berwickshire) on the 15th and **Booted Warbler** *Hippolais caligata* on St. Agnes on the 23rd. The Greenish Warbler at Bamburgh (Northumberland) (59: 352) was retrapped on 5th September. A **Pechora Pipit** *Anthus gustavi* at Spurn on 26th September was the first British record of this Russian and Siberian pipit away from Fair Isle where, of course, there have been some 20 records; Fair Isle, not to be outdone, had its first since 1958 on 14-15th October. **Red-throated Pipits** *A. cervinus* were at Dungeness (Kent) on 15th September and Fair Isle and St. Agnes in late October, but the pipit of the month was **Richard's Pipit** *A. noraeaeelandiae*. Between 18th September and 24th October, but particularly 24th September-7th October, there was a considerable invasion of Richard's Pipits with up to three on Lundy, at least three on Fair Isle, one on Gwennap Head, and six or seven on Bardsey Island (Caernarvonshire), to say nothing of others in Co. Cork, Scilly, Middlesex, Northamptonshire and Yorkshire, a total of about 30 altogether.

Another Fair Isle speciality only once before recorded elsewhere in Britain is the **Striped Wagtail** *Motacilla citreola*, but two were identified at Stanpit Marshes (Dorsetshire) on 15th October. The usual scattering of **Scarlet Rosefinches** *Spodacus erythrurus* in September and October included a maximum of three on Fair Isle, others on Foula and Whalsay (Shetland), at Spurn and even down on Lundy. In this year of irruption by **Crossbills** *Loxia curvirostra*, it is interesting that the number of **Two-barred Crossbills** *L. leucoptera* rose to five between 12th September and 22nd October, with dead ones in Shetland and Cheshire and one seen in Surrey in addition to those already identified in Hertfordshire and Norfolk (59: 351). Eastern buntings were represented by **Rustic Buntings** *Emberiza rustica* on Holy Island (Northumberland) on 1st September and Fair Isle on 20th October; and several **Little Buntings** *E. pusilla* on the east coast between Shetland and Northumberland and also in Cornwall during 8th-17th October. An **Arctic Redpoll** *Acanthis nemanni* was identified at Rothbury (Northumberland) on 30th October.

These Scandinavian and eastern rarities, many of them in the second and third weeks of October, should be seen against the background of large influxes of winter visitors, **Goldcrests** *Regulus regulus*, **Robins** *Eritacus rubecula* and other birds about that time. **Redwings** *Turdus iliacus* began to arrive in force in late September and reached a peak in the ten days from 5th October when there were also many thousands of **Fieldfares** *T. pilaris*, even across in Wales. Many **Bramblings** *Fringilla montifringilla* came in at this time (1,500 at Fair Isle and Spurn and even 200 on Bardsey and 100 on St. Agnes) and quite outstanding were the numbers of **Ring-necked Pheasants** *Turdus torquatus* down the east coast, with concentrations of up to 40 in Shetland, 50 in Yorkshire and Norfolk, 80 in Suffolk and 100 in Kent as well as smaller numbers on the west side (40 on Bardsey and 24 in Cornwall). **Great Grey Owls** *Lanius excubitor* were also much in evidence on the east coast (at least 15 at Spurn in October) and some also came inland, while Bardsey had its first-ever record. Though there were quite a few **Red-breasted Flycatchers** *Ficedula parva*, numbers were, if anything, smaller than in recent years; apart from rather fewer on the east coast, they included a scattering in the south-west (Scilly, Cornwall, Co. Cork and even Glamorgan). As is often the case, **Firecrests** *Regulus ignicapillus* arrived at the same time in southern and eastern districts west to Scilly and north to Yorkshire, also Bardsey.

In late September and even the first half of October continued to produce a few **Reithrolopias** *Luscinia svecica* (south and east coasts), **Icterine Warblers** *Hippolais icterina* (Northumberland and Caernarvon south to Kent, Devon and Co. Cork),

Barred Warblers *Sylvia nisoria* (including one inland at Settle, Yorkshire, on 9th October) and **Ortolan Buntings** *Emberiza hortulana* (including as many as 20 in Cornwall during 2nd-8th October) (see 59: 351-352).

Among larger species there was a small scattering of **Cranes** *Grus grus*, mostly single birds, in Lancashire, Anglesey and Devon between 23rd August and 23rd September (possibly the same individual) and in Aberdeenshire, Yorkshire (four) and Lincolnshire (two) in October-early November. **Great Snipe** *Gallinago media* were identified near Swindon (Wiltshire) and at Salhouse (Norfolk) on 24th and 27th August. A few **Long-tailed Skuas** *Stercorarius longicaudus* were identified on the east coast (Shetland to East Anglia) in September and early October, while one was found dead at Staines (Middlesex) in late September and one dying at Hollingbourne (Kent) on the 28th. There were also a few **Waxwings** *Bombycilla garrulus* from Shetland to East Anglia as well as inland and down in Scilly and Cornwall in October and a considerable scattering of **Rough-legged Buzzards** *Buteo lagopus* down the east coast later in the month and in early November, with a few inland and one or two as far south and west as Cornwall and Scilly.

OTHER EUROPEAN SPECIES

A **Purple Heron** *Ardea purpurea* stayed at Wyboston (Bedfordshire) for a month from 10th August. **Spotted Crakes** *Porzana porzana* were seen from Scilly and Sussex north to Derby and Stafford in September-October, and a **Little Crake** *P. parva* was identified on St. Agnes on 25th September (two small crakes were also seen on Cape Clear in September). **Gull-billed Terns** *Gelochelidon nilotica* included ones as far north as Dalmeny (West Lothian) and Hauxley (Northumberland) on 3rd and 10th September. Up to three **Temminck's Stints** *Calidris temminckii* were seen at Dungeness during 4th-15th September and there was also an additional **White-winged Black Tern** *Chlidonias leucopterus* at Cley (Norfolk) in early September (59: 350). It continued to be a poor autumn for **Hoopoes** *Upupa epops*, but as late as the second week of October an injured one was found near Cambridge and another was seen on Holy Island (Northumberland).

Among passerines we might mention a **Red-rumped Swallow** *Hirundo daurica* at Hilfield Park Reservoir (Hertfordshire) on 1st October; an **Olivaceous Warbler** *Hippolais pallida* at Beachy Head (Sussex) on 3rd September; a scattering of **Melodious Warblers** *H. polyglotta* (though possibly fewer than usual), mainly in Scilly, Cornwall and southern Ireland in September and the first half of October; a **Sub-alpine Warbler** *Sylvia cantillans* on the Calf of Man in early September; **Aquatic Warblers** *Acrocephalus paludicola* in Kent, Cornwall and Scilly between 18th September and 22nd October (see 59: 352), a **Bonelli's Warbler** *Phylloscopus bonelli* on St. Mary's Island (Northumberland) on 10th October; and a scattering of **Tawny Pipits** *Anthus campestris* in the south and east from Co. Cork to Yorkshire between 27th August and 14th October. **Woodchat Shrikes** *Lanius senator* totalled four at Lundy, Druridge (Northumberland), Spurn and Cley between 22nd August and 14th October and there were **Lesser Grey Shrikes** *L. minor* at Spurn, Fair Isle and Barns Ness (East Lothian) on 27th August, 21st September and 14th October.

There was also an interesting crop of **Serins** *Serinus serinus* between 8th and 22nd October, at Dungeness, Hengistbury Head (Hampshire) (two) and Spurn. Pride of place, however, must go to another bird at the last of these localities. This was a **Penduline Tit** *Remiz pendulinus* on 22nd-28th October. Never before recorded in Britain, this may seem an unlikely species, but, like the Serin, it is one which has been spreading in recent years, so much so that a 'cock's nest' was found in the Netherlands in 1962 (*Limosa*, 38: 6-12); a nest with six addled eggs in Denmark in 1964 was followed by no less than four pairs attempting to breed and one successfully rearing young there in 1965 (*D.O.F.T.*, 59: 41-47; 60: 108-117); and three out of a party of four or five were trapped on Ushant in November 1963 (*Penn ar Bed*, 36: 153-154).

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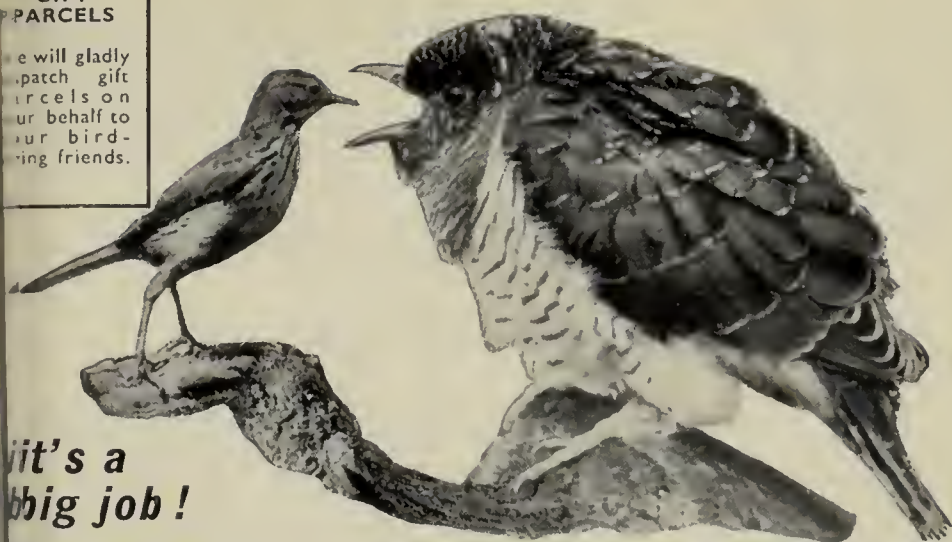
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Report on bird-ringing for 1965*

By Robert Spencer

Ringling Officer, B.T.O.

THIS AGE of astronauts and moon shots, there can be few people who have not heard the phrase 'all systems go'. It is inelegant, and doubtfully correct syntax, but it does have a ring of purpose and reality. From the tension and thrust of rocketry to the gentle world of ornithology is a far cry, yet the same phrase is perhaps a not inappropriate summing up of the ringing scheme in 1965. It was, in every way, a vintage year, with the annual ringing total exceeding half a million for the first time, and with recoveries in such profusion that a far longer report than this would be required to do full justice to them.

If we indulge in a moment of quiet self-congratulation at this figure, it is not because there is any particular magic about the figure of half a million, but rather because of a growing conviction that ringing has really come into its own. Year by year the list of species about which it has something original and valuable to say grows longer, and this trend will clearly continue. Nowadays government departments, medical and agricultural institutes and universities all find occasion to consult our records and sometimes to participate actively in the work. Ringing is, as is sometimes claimed, no more than a sport (and this we would emphatically deny), it is certainly a constructive one, the end products of which may benefit birds and men alike.

The total of half a million, it will be seen from table 1, included over 200,000 nestlings. This was an increase of 15,000 on 1964 and the highest figure ever achieved in a single year. Seabirds, notably Manx shearwaters *Puffinus puffinus* and Black-headed Gulls *Larus ridibundus*,

This is the twenty-ninth report issued on behalf of the Ringing and Migration Committee (formerly the Bird-Ringing Committee) and is a publication of the British Society for Ornithology. For the twenty-eighth report, see *Brit. Birds*, 58: 533-596.

showed the biggest increases, but there was also an upward trend among many of the commoner passerines, in particular the warblers. It is encouraging to note that the figure of 35 nestling Sparrowhawks *Accipiter nisus* was the highest in any one year since 1950. Kestrels *Falco tinnunculus*, too, and some of the owls, showed welcome increases and one dares to hope that these are early indications of a reduced contamination of the food-chain by toxic chemicals. There were similarly encouraging signs that the populations of some of the species most hard hit by the winter of 1963 are now beginning to return to normal. For example, the numbers of nestling Stonechats *Saxicola torquata* ringed in the years 1963-65 were 9, 81 and 142 respectively, although, in assessing the significance of these figures, one must bear in mind that two or three dedicated 'Saxicolophiles', working in localised strongholds of the species, may have biased the picture.

The year's trapping figures, as set forth in table 2, provide the bare details of many a successful venture. They are, it is true, dominated by the massive total of 66,611 Sand Martins *Riparia riparia*—the largest number of birds of any one species ever to be caught in one year—but the enterprise and derring-do involved in the compilation of some comparatively modest totals should not be overlooked. Consider, for example, the many night watches necessary to catch 3,497 Storm Petrels *Hydrobates pelagicus*, or the cliff work involved in handling 846 adult Razorbills *Alca torda*. The catching of 219 Collared Doves *Streptopelia decaocto* during the year may seem to be a rather trivial achievement until it is noticed that this figure more than doubled the previous grand total. If its present rate of fecundity and expansion continue, there can be little doubt that this species will become something of a pest within the next decade, so that anything ringers can learn now about its pattern of movements and longevity is likely to prove of considerable value.

1965 will be remembered as a year for Waxwings *Bombycilla garrulus*, as the year when Bearded Tits *Panurus biarmicus* burst out of their East Anglian stronghold and, augmented by others from the Netherlands, scattered widely about the land, and as a year of exceptionally well marked passages of Goldcrests *Regulus regulus* and Ring Ouzels *Turdus torquatus* in October. All these events are faithfully reflected in the improved trapping figures as, also, is another outstanding event of the year—the great east coast 'avalanche' of migrants in early September. Redstarts *Phoenicurus phoenicurus*, Pied Flycatchers *Ficedula hypoleuca*, Garden Warblers *Sylvia borin*, Wrynecks *Jynx torquilla* and Bluethroats *Luscinia svecica*, to mention but a few of the species concerned, made landfall in East Anglia in their thousands and tens of thousands, and the three or four days before they finally moved on provided memorable trapping. The 114 Wrynecks ringed in 1965 were more than had been handled in the previous six years put to-

ether and new records were similarly established for nearly all the species concerned in that September arrival.

This brief survey would not be complete without a reference to the species ringed for the first time during 1965. The additions were Iceland Gull *Larus glaucoides* (Fair Isle Bird Observatory), Savi's Warbler *Locustella luscinioides* (G. L. Webber, and Sandwich Bay Bird Observatory), Moustached Warbler *Luscinola melanopogon* (South Buckingham Ringing Group) and White-throated Sparrow *Zonotrichia bicollis* (Walney Bird Observatory). A fifth species, the Indian Tree Pit *Anthus hodgsoni*, was caught on Fair Isle in 1964, but remained unidentified (and therefore did not appear in table 2) until a second individual was captured in 1965. The total of species ringed in the British Isles since 1909 has thus increased by five since the publication of the twenty-eighth report and now stands at 318.

The year's harvest of recoveries was excellent in both quality and quantity, and the problem of selecting those for inclusion in this report was even more taxing than usual. Recoveries of Manx Shearwaters in South America are now of such regular occurrence that it is no longer possible to publish them all in full. However, even in the face of the most fierce competition for space, the 5,700-mile flight of C80681 to Brazil in little more than a fortnight must claim a place, as must the quite unprecedented journeys to African waters. For many years, of course, the Manx Shearwater has been alone in providing recoveries in the Neotropics, but it lost this distinction in 1965 when an Arctic Skua *Stercorarius parasiticus* was recovered off eastern Brazil in May. One wonders whether, as was the case with the Manx Shearwater, this will prove to be merely a forerunner, for the species has been recorded on passage off the coasts of Brazil and Argentina in considerable numbers.

Several other species of seabirds produced noteworthy records, of which perhaps the most interesting were a Gannet *Sula bassana* in Turkey and an Arctic Tern *Sterna paradisaea* at 54°E. in the Russian east of Perm. It was the latter species, too, which established the longevity record of the year, with an age of nearly 27 years. It is an interesting thought that a quarter of our present-day ringers had not been born when this bird set off on its first migration.

The exacting work of wader catching continues to reward its enthusiasts and the report includes the first records of Whimbrel *Numenius phaeopus* in the U.S.S.R. and Purple Sandpiper *Calidris maritima* and Ringed Plover *Charadrius hiaticula* in Greenland. There was an added quinquity about the flight of the plover for it was netted at Perry Oaks Game-farm on the industrialised western outskirts of London. It would be hard to find a greater contrast of habitats than those experienced by this bird.

by flying from the Eddystone Light to Unst (although it was more

probably the other way round!), Skylark *Alauda arvensis* AR 45650 came near to achieving the longest possible journey within the British Isles. Unfortunately, the information we have on this bird does not tell us all that we would like to know, but it seems probable that it bred (or was bred) in Unst and that it arrived at the Eddystone whilst *en route* for France or Spain before returning to Unst the following year. A Cuckoo *Cuculus canorus* shot in Malta was the first British-ringed bird to have been recovered there for over thirty years. The record falls neatly into place beside several from Italy, thus indicating a movement of this species across the central Mediterranean. Like the Cuckoo, the Lesser Whitethroat *Sylvia curruca* passes through Italy and the report includes what we have come to regard as the usual quota of recoveries from the north of that country; in addition, there was the first, and most welcome, record from Egypt. Few of the species we ring have produced so interesting a pattern of recoveries as the Lesser Whitethroat and it will obviously repay close attention in the future.

A number of birds caught during the great east coast rush were recovered soon afterwards: a Spotted Flycatcher *Muscicapa striata* in Italy (only the second), a Garden Warbler, three Redstarts and no fewer than four Pied Flycatchers. This list is confined to birds ringed at coastal localities during the vital three or four days; the full score could well be much higher, for it is possible that birds involved in the fall spread widely through southern England and merged with the departing British populations. It was, in any case, an excellent year for recoveries of small night migrants and the lists given in the body of the report, especially those for warblers, are longer than ever before.

Normally the finches and buntings, if they move at all, do so within somewhat narrow and predictable confines so that their recoveries seldom call for comment. In 1965, however, there were several interesting or unusual records. A House Sparrow *Passer domesticus* in France was much further south and west than the only two previous foreign recoveries and at a date which suggests that it may have been breeding. Linnets *Acanthis cannabina* are recovered annually in Spain in some numbers, but a record from Portugal was only the second. Since recoveries of this species have come from as far south as Cadiz, it has always seemed likely that a proportion of the birds cross the Straits of Gibraltar and that one could expect a report from south of the Mediterranean. But in the event a Goldfinch *Carduelis carduelis* in Ceuta was the first African recovery of any British-ringed finch. The recovery of a Siskin *Carduelis spinus* in Sweden is remarkable only in that it was the first from Scandinavia; otherwise, it occasions no surprise. The same cannot be said for the Brambling *Fringilla montifringilla* reported in central north Italy in October, for nearly all the previous foreign recoveries of this species have been in northern and western Europe. Finally, and even more surprisingly, there is

the report of a Yellowhammer *Emberiza citrinella* in the French department of Oise; since previous recoveries of this species have indicated that the breeding population is remarkably sedentary, it is probable that the bird was of Continental origin.

There remains but one event to record. In 1965, after more than half a century of service to ringing, for the last 28 years in the capacity of Chairman of the Committee, Sir Landsborough Thomson retired. Throughout this long period, during which the scheme progressed from the first tentative ventures of youth to the mature and valuable enterprise we know today, his wisdom and skill guided it surely on its course. In expressing our thanks to him we are happy in the knowledge that his interest in the work continues. We hope that he will still find time to continue the series of analyses begun so long ago.

COMMITTEE

The members of the Ringing and Migration Committee on 31st December 1965 were Dr. P. R. Evans (Chairman), H. J. Boyd, Dr. J. C. Coulson, J. Cudworth, J. J. M. Flegg, P. A. D. Hollom, Dr. C. D. T. Minton, Dr. C. M. Perrins and R. G. Pettitt, with J. D. Macdonald (representing the Trustees of the British Museum) and Dr. Bruce Campbell, R. C. Homes, J. M. McMeeking, Dr. R. K. Murton and D. R. Wilson (*ex-officiis*) and Robert Spencer (Secretary).

FINANCE

The work of the Ringing Scheme is financed partly by the Nature Conservancy, an annual grant being received to cover the salaries of the scientific staff, and partly from the proceeds of the sale of rings and other equipment and from revenue derived from ringing permits. The Wildfowl Trust obtained their rings at cost price and made a contribution of £75 towards the costs of administration. The publishers of *British Birds* made their usual grant of £25. Accommodation and certain services are provided by the British Trust for Ornithology, and their cost is normally covered by the income of the scheme. Income and expenditure are incorporated in the accounts of the Trust, published in its Annual Report.

Rising costs now prevent the publication of the 'Report on bird-ringing' and the 'Recoveries in Great Britain and Ireland of birds ringed abroad' as a special supplement. Their incorporation in ordinary issues of *British Birds* would have meant a reduction in size, but the B.T.O. will be making a payment towards maintaining the same length as in previous years.

STAFF

Robert Spencer, Robert Hudson, C. J. Mead, Mrs. U. V. Mead and Mrs. M. Benson.

ACKNOWLEDGEMENTS

Grateful acknowledgement is made to the Nature Conservancy for their generous grant towards the salaries of the headquarters staff, and to the Wildfowl Trust and H. F. & G. Witherby for their continued financial support. We are indebted to the Trustees of the British Museum for permitting us to use the address of the Museum on our rings and to telephonists and staff there for forwarding mail and dealing with enquiries.

The Biological Records Centre of the Nature Conservancy, especially Mrs. M. Horrill, gave invaluable help in the preparation of tables 1 and 2 of this report and we are most grateful to them. Peter Davis compiled a number of the species summary tables A-P, and R. C. Faulkner prepared and drew the maps.

PUBLICATIONS

The following papers, based wholly or partially on the results of British ringing, have been published:

- DAVIS, P. (1965): 'Recoveries of Swallows ringed in Britain and Ireland'. *Bird Study*, 12: 151-169.
- LLOYD-EVANS, L., and NAU, B. S. (1965): 'A ringing study of Greenfinch weights'. *Rye Meads Ringing Group, 3rd Ann. Rep.*: 23-39.
- MILLS, D. H. (1965): 'The distribution and food of the Cormorant in Scottish inland waters'. *Freshwater and Salmon Fisheries Research*, no. 35. H.M.S.O. Edinburgh.
- MILNE, H. (1965): 'Seasonal movements and distribution of Eiders in northeast Scotland'. *Bird Study*, 12: 170-180.
- PERRINS, C. M. (1965): 'Population fluctuations and clutch-size in the Great Tit, *Parus major* L.'. *J. Anim. Ecol.*, 34: 601-647.
- ROBERTS, E. L. (1966): 'Movements and flock behaviour of Barnacle Geese on the Solway Firth'. *Wildfowl Trust, 17th Ann. Rep.*: 36-45.
- SOUTHERN, H. N., CARRICK, R., and POTTER, W. G. (1965): 'The natural history of a population of Guillemots (*Uria aalge* Pont.)'. *J. Anim. Ecol.*, 34: 649-665.
- WILLIAMSON, K. (1965): 'Moult and its relation to taxonomy in Rock and Water Pipits'. *Brit. Birds*, 58: 493-504.

Table 1

NUMBERS OF BIRDS RINGED AND RECOVERED

				Ringed		Recovered
				Juv./Adult	Pullus*	Total
1965 ..	..	..	427,051	91,689	518,740	14,182
1964 ..	..	..	372,537	76,700	449,237	12,665
1963 ..	..	..	355,007	80,918	435,925	14,397
1962 ..	..	..	307,924	81,551	389,475	11,689
1961 ..	..	..	272,919	77,443	350,362	9,238
1960 ..	..	..	219,104	60,085	279,189	7,911

*An explanation of the term *pullus* or *pull*, appears on page 452.

REPORT ON BIRD-RINGING FOR 1965

				Ringed		Recovered
				Juv./Adult	Pullus	Total
1959	184,837	57,488	242,325	6,949		
1958	155,414	45,421	200,835	6,374		
1957	137,060	49,286	186,346	5,497		
1956	104,665	40,069	144,734	4,808		
Grand total ringed 1909-65				4,674,997		
Grand total recovered 1909-65				130,871		

Table 2

RINGING AND RECOVERY TOTALS TO 31ST DECEMBER 1965

Section 1—Species of which more than 100 have been ringed

				Ringed		Recovered	
				Juv./Adult	Pullus	1965 total	Grand total
Arctic Skua	15	—	15	258	12		
Petrel	17	—	17	962	7		
Petrel	3,463	34	3,497	14,835	43		
Seabird	1,981	9,378	11,359	134,652	113		
.. ..	324	769	1,093	10,671	21		
.. ..	29	1,273	1,302	28,364	80		
.. ..	10	903	913	8,873	199		
.. ..	202	2,990	3,192	23,777	374		
.. ..	7	137	144	4,978	16		
.. ..	3,213	414	3,627	51,480	770		
.. ..	1,395	2	1,397	41,224	383		
.. ..	17	—	17	274	5		
.. ..	4	—	4	206	—		
.. ..	71	—	71	2,743	32		
.. ..	41	—	41	840	16		
.. ..	59	23	82	823	16		
Duck	53	—	53	1,261	9		
.. ..	38	6	44	332	5		
.. ..	389	646	1,035	5,173	120		
.. ..	84	93	177	2,007	9		
.. ..	107	19	126	1,394	27		
.. ..	—	—	—	582	7		
.. ..	1	—	1	11,824	78		
.. ..	3	15	18	354	2		
.. ..	131	3	134	1,819	36		
.. ..	1,504	220	1,724	14,282	849		
.. ..	1	46	47	1,186	2		
.. ..	15	35	50	1,519	10		
.. ..	1	—	1	126	—		
.. ..	—	58	58	810	6		
.. ..	—	5	5	268	1		
.. ..	—	8	8	203	—		
.. ..	2	26	28	857	4		
.. ..	57	348	405	4,005	48		
.. ..	—	—	—	1,538	—		
.. ..	20	—	20	112	—		

*Newly promoted from Section 2

BRITISH BIRDS

Ringed					Recovered
	Juv./Adult	Pullus	1965 total	Grand total	1965
Partridge	14	—	14	322	3
Water Rail	55	—	55	870	3
Corncrake	4	—	4	753	—
Moorhen	575	16	591	8,198	30
Coot	176	7	183	2,660	10
Oystercatcher	273	432	705	15,139	157
Lapwing	152	1,106	1,258	81,475	46
Ringed Plover	218	146	364	6,527	8
Little Ringed Plover	23	37	60	640	—
Grey Plover	98	—	98	800	1
Golden Plover	54	12	66	895	3
Turnstone	120	—	120	1,425	1
Snipe	314	14	328	8,481	30
Jack Snipe	58	—	58	669	3
Woodcock	21	12	33	5,873	2
Curlew	157	130	287	8,456	23
Bar-tailed Godwit	57	—	57	252	2
Green Sandpiper	30	—	30	324	2
Wood Sandpiper	21	—	21	179	—
Common Sandpiper	350	87	437	5,974	7
Redshank	616	76	692	10,094	20
Greenshank	26	1	27	241	1
Knot	764	—	764	4,832	8
Purple Sandpiper	10	—	10	203	1
Little Stint	23	—	23	415	2
Dunlin	5,087	7	5,094	33,986	106
Curlew Sandpiper	22	—	22	246	—
Sanderling	36	—	36	274	1
Ruff	121	—	121	833	6
Stone Curlew	—	2	2	381	—
Arctic Skua	2	40	42	1,642	4
Great Skua	—	1,013	1,013	6,664	23
Great Black-backed Gull	20	453	473	6,005	45
Lesser Black-backed Gull	96	4,725	4,821	47,161	183
Herring Gull	489	5,240	5,729	62,833	247
Common Gull	183	156	339	6,002	16
Black-headed Gull	1,287	9,147	10,434	85,441	252
Kittiwake	154	1,736	1,890	23,787	42
Common Tern	72	2,369	2,441	42,558	35
Arctic Tern	96	2,626	2,722	34,399	32
Roseate Tern	11	728	739	9,236	14
Little Tern	3	36	39	2,456	—
Sandwich Tern	113	3,218	3,331	54,068	78
Razorbill	846	490	1,336	15,192	28
Guillemot	231	531	762	10,101	23
Black Guillemot	22	92	114	953	1
Puffin	819	82	901	20,295	16
Stock Dove	10	59	69	2,368	3
Rock Dove	—	—	—	125	—
Woodpigeon	380	459	839	11,697	103
Turtle Dove	101	86	187	2,586	18
Collared Dove	219	49	269	477	17
Cuckoo	66	42	108	2,422	5
Barn Owl	22	63	85	1,588	23
Little Owl	28	68	96	2,066	9
Tawny Owl	39	132	171	3,346	23
Long-eared Owl	6	19	25	664	3
Short-eared Owl	12	17	29	510	4

REPORT ON BIRD-RINGING FOR 1965

				Ringed		Recovered	
				Juv./Adult	Pullus	1965 total	Grand total
						1965	Grand total
r	8	4	12	544	—	12	
her	8,495	100	8,595	43,838	139	883	
Woodpecker	171	—	171	2,010	4	66	
Spotted Woodpecker	23	—	23	724	3	38	
Spotted Woodpecker	86	2	88	1,573	6	85	
Spotted Woodpecker	12	—	12	125	—	—	
k	114	—	114	780	—	13	
rk	2	10	12	515	—	2	
.. ..	401	305	706	14,781	4	127	
.. ..	35,347	6,774	42,121	250,420	433	2,008	
Martin	3,518	13	3,531	39,634	18	310	
Martin	66,459	152	66,611	247,686	2,119	5,435	
.. ..	—	94	94	1,354	11	147	
/Hooded Crow	33	196	229	4,824	22	332	
.. ..	929	604	1,533	13,685	55	891	
.. ..	205	163	368	11,849	26	720	
.. ..	42	138	180	4,032	19	226	
.. ..	225	33	258	3,218	15	242	
.. ..	3	4	7	344	1	27	
Tit	8,476	3,443	11,919	106,660	176	1,780	
.. ..	21,813	3,952	25,765	226,523	338	4,129	
.. ..	1,299	238	1,537	11,873	12	144	
Tit	744	78	822	5,684	5	52	
Tit	818	102	920	3,061	5	16	
iled Tit	1,615	—	1,615	6,923	10	64	
Tit	754	11	765	2,069	36	51	
h	155	91	246	3,719	8	100	
pper	594	35	629	3,227	7	18	
.. ..	2,661	22	2,683	22,553	17	167	
.. ..	119	188	307	6,445	10	79	
hrush	585	200	785	14,482	29	492	
.. ..	1,180	—	1,180	5,244	10	104	
hrush	8,947	2,184	11,131	175,348	316	5,070	
g	2,433	—	2,433	20,253	37	316	
uzel	156	72	228	2,397	7	43	
d	32,349	3,927	36,276	355,055	1,597	13,146	
r	904	196	1,100	21,864	5	114	
at	133	142	275	4,307	2	38	
at	569	135	704	8,885	7	39	
.. ..	1,964	750	2,714	20,918	19	121	
edstart	29	—	29	865	—	19	
gale	88	31	119	4,095	1	18	
oat	42	—	42	277	—	2	
.. ..	10,732	847	11,579	124,572	231	2,958	
pper Warbler	220	21	241	1,487	—	5	
arbler	3,985	366	4,351	19,755	44	156	
arbler	9	—	9	134	—	—	
arbler	8,493	281	8,774	36,303	30	107	
us Warbler	13	—	13	121	—	—	
Warbler	23	—	23	147	1	2	
.. ..	3,875	113	3,988	16,442	14	73	
Warbler	52	—	52	315	—	—	
Warbler	2,593	87	2,680	11,808	13	39	
roat	8,254	636	8,890	74,878	41	321	
Whitethroat	1,596	74	1,670	7,812	8	39	
l Warbler	1	—	1	154	—	1	
Warbler	10,921	1,458	12,379	100,368	38	271	
f	4,278	119	4,397	25,477	14	85	

BRITISH BIRDS

Ringed					Recoveries	
	Juv./Adult	Pullus	1965 total	Grand total	1965	
Wood Warbler	25	124	149	2,781	—	
Goldcrest	3,301	—	3,301	12,638	4	
Firecrest	12	—	12	332	—	
Spotted Flycatcher	1,318	445	1,763	19,625	12	
Pied Flycatcher	1,113	596	1,709	21,211	13	
Red-breasted Flycatcher	11	—	11	178	—	
Dunnock	12,011	961	12,972	110,716	189	1
Meadow Pipit	2,078	276	2,354	43,023	27	
Tree Pipit	154	112	266	5,049	—	
Rock/Water Pipit	586	65	651	10,682	8	
Pied/White Wagtail	2,597	336	2,933	28,305	74	
Grey Wagtail	98	46	144	3,762	3	
Yellow Wagtail <i>ssp.</i>	1,616	108	1,724	19,025	23	
Waxwing	148	—	148	310	2	
Red-backed Shrike	31	20	51	2,760	—	
Starling	24,532	1,213	25,745	446,248	1,286	16
Hawfinch	10	4	14	300	—	
Greenfinch	26,811	577	27,388	190,853	714	4
Goldfinch	2,400	131	2,531	18,995	53	
Siskin	162	—	162	1,071	1	
Linnet	10,710	1,376	12,086	98,308	116	
Twite	90	26	116	2,807	—	
Redpoll	1,914	70	1,984	8,727	36	
Bullfinch	5,261	252	5,513	29,896	140	
Crossbill	—	—	—	466	—	
Chaffinch	10,932	309	11,241	132,581	95	1
Brambling	2,305	—	2,305	10,718	10	
Yellowhammer	2,273	237	2,510	25,939	19	
Corn Bunting	114	16	130	1,616	2	
Cirl Bunting	4	—	4	205	—	
Reed Bunting	4,753	535	5,288	38,000	37	
Snow Bunting	42	—	42	3,058	1	
House Sparrow	17,105	692	17,797	196,918	345	3
Tree Sparrow	4,771	1,548	6,319	48,148	31	

Section 2—Species of which fewer than 100 have been ringed

(1965 total, grand total, 1965 recoveries and grand total recoveries are given in that order)

Black-throated Diver	3	—	—	Goosander	2	73	—
Great Northern Diver	3	—	—	Smew	—	2	—
Red-throated Diver	3	24	3	Bean Goose	—	1	—
Great Crested Grebe	5	55	1	Brent Goose	—	8	—
Red-necked Grebe	—	2	—	Whooper Swan	5	28	1
Slavonian Grebe	—	3	—	Bewick's Swan	6	18	1
Cory's Shearwater	—	1	—	Kite	—	1	—
Wilson's Petrel	—	2	—	Rough-legged Buzzard	—	1	—
Little Bittern	—	4	—	Golden Eagle	2	64	1
Bittern	—	49	8	Hobby	2	65	—
Red-crested Pochard	—	16	5	Red-footed Falcon	—	1	—
Scaup	13	68	15	Black Grouse	17	64	3
Mandarin Duck	1	6	—	Ptarmigan	—	3	—
Goldeneye	1	32	6	Capercaillie	—	3	—
Long-tailed Duck	1	6	1	Quail	2	12	1
Velvet Scoter	—	3	1	Pheasant	5	72	—
Common Scoter	2	17	3	Spotted Crake	2	19	—
Red-breasted Merganser	2	24	1	Kentish Plover	—	1	—

REPORT ON BIRD-RINGING FOR 1965

..	..	..	4	49	—	1	Great Reed Warbler	..	1	10	—	—
Sandpiper	..	..	—	1	—	—	Paddyfield Warbler	..	—	1	—	—
rel	..	..	3	80	2	4	Aquatic Warbler	..	7	42	—	—
ailed Godwit	..	..	2	21	—	—	Thick-billed Warbler	..	—	1	—	—
l Redshank	..	..	18	87	—	2	Olivaceous Warbler	..	—	3	—	—
nk's Stint	..	..	—	4	—	—	Booted Warbler	..	—	1	—	—
limated Sandpiper	..	..	—	1	—	—	Orphean Warbler	..	—	1	—	—
umped Sandpiper	..	..	1	5	—	—	Sardinian Warbler	..	—	1	—	—
l Sandpiper	..	..	1	18	—	—	Subalpine Warbler	..	—	12	—	—
ndpiper	..	..	—	1	—	—	Greenish Warbler	..	2	22	—	—
n Sandpiper	..	..	—	1	—	—	Bonelli's Warbler	..	2	12	—	—
east Sandpiper	..	..	—	2	—	1	Arctic Warbler	..	1	15	—	—
..	..	..	—	1	—	—	Yellow-browed Warbler	..	6	75	—	1
halarope	..	..	1	46	—	—	Pallas's Warbler	..	2	7	—	—
ked Phalarope	..	..	3	27	—	—	Dusky Warbler	..	1	3	—	—
ne Skua	..	..	—	2	—	1	Radde's Warbler	..	—	3	—	—
us Gull	..	..	—	5	—	1	Richard's Pipit	..	—	5	—	—
Gull*	..	..	1	1	—	—	Tawny Pipit	..	1	5	—	—
ull	..	..	3	5	—	1	Indian Tree Pipit†	..	1	2	—	—
s Gull	..	..	—	1	—	—	Pechora Pipit	..	—	1	—	—
ern	..	..	2	6	—	—	Red-throated Pipit	..	1	5	—	—
led Tern	..	..	—	1	—	—	Citrine Wagtail	..	—	4	—	—
uk	..	..	—	22	—	2	Great Grey Shrike	..	6	77	—	2
Owl	..	..	—	1	—	—	Lesser Grey Shrike	..	—	5	—	2
Owl	..	..	—	1	—	—	Woodchat Shrike	..	7	45	—	—
..	..	..	1	14	—	—	Myrtle Warbler	..	—	1	—	—
ed Lark	..	..	1	5	—	—	Northern Water Thrush	..	—	1	—	—
ark	..	..	2	24	—	—	Yellowthroat	..	—	1	—	—
umped Swallow	..	..	—	1	—	—	Bobolink	..	—	1	—	—
Oriole	..	..	—	4	—	—	Slate-coloured Junco	..	—	1	—	—
ker	..	..	—	1	—	—	Rose-coloured Starling	..	—	2	—	—
Tit	..	..	6	72	—	—	Baltimore Oriole	..	—	2	—	—
roated Thrush	..	..	—	1	—	—	Summer Tanager	..	—	1	—	—
Thrush	..	..	—	2	—	—	Tanager sp. ††	..	—	1	—	—
an Robin	..	..	—	2	—	—	Arctic Redpoll	..	1	4	—	—
Thrush	..	..	—	1	—	—	Serin	..	—	2	—	—
neeked Thrush	..	..	—	3	—	1	Scarlet Grosbeak	..	1	32	—	—
Wheatear	..	..	—	2	—	—	Pine Grosbeak	..	—	1	—	—
ared Wheatear	..	..	—	3	—	—	Parrot Crossbill	..	—	42	—	—
neatear	..	..	—	1	—	—	Black-headed Bunting	..	—	2	—	—
Nightingale	..	..	4	6	—	—	Red-headed Bunting	..	1	17	—	1
Warbler	..	..	—	1	—	—	Yellow-breasted Bunting	..	—	4	—	—
Warbler	..	..	—	2	—	—	Ortolan	..	4	37	—	—
Warbler	..	..	—	1	—	—	Rustic Bunting	..	—	11	—	1
Warbler*	..	..	2	2	—	—	Little Bunting	..	1	17	—	—
ated Warbler	..	..	—	1	—	—	Fox Sparrow	..	—	1	—	—
Grasshopper	..	..	—	1	—	—	White-throated Sparrow*	..	1	1	—	—
ler	..	..	—	1	—	—	Song Sparrow	..	—	2	—	—
ched Warbler*	..	..	1	1	—	—	Lapland Bunting	..	1	77	—	—

*Added to the list in 1965

†One ringed in 1964, but identity not confirmed until 1965

††Previously listed as Scarlet Tanager

Selected list of recoveries reported during 1965

The following list is highly selective. To indicate the quantity and nature of material omitted, the total number of recoveries is stated in brackets after scientific name of each species, followed (but not in all cases) by the minimum movement to qualify for inclusion and the longest time lapsed between ringing and recovery. All foreign recoveries are either given in full or mentioned in summaries. Species which produced only local movements—generally less than ten miles—are left out, but the individual totals thus omitted are listed in table

Key to symbols and terms

- Ring number: Where this is in italics the ring has been returned.
 Age: pull. (pullus)—nestling or chick, *not yet flying*;
 juv.—young, *able to fly freely*;
 1stW.—first winter;
 1stS.—first summer (one year old);
 f.g.—full-grown, age uncertain;
 ad.—adult; at least one year old.
 Sex: ♂—male;
 ♀—female.
 Manner of recovery: v—caught or trapped, and released with ring;
 +—shot or killed by man;
 x—found dead or dying;
 xA—found long dead;
 ()—caught or trapped alive and not released, or released but with ring removed;
 [/]—manner of recovery unknown.
 Date of recovery: Where this is unknown the date of the reporting letter is given in brackets.
 Distance: The distance, given in miles, and the directions are approximate.
 Arrangement of entry: Recoveries are arranged by species, and within species usually ringing locality from north to south. Ringing details are given on the first line and recovery data on the second.

Co-ordinates of principal ringing stations omitted from the text

Abberton: 51°50'N. 0°53'E. (Essex)	Great Saltee: 52°07'N. 6°35'W. (Wexford)
Bardsey Island: 52°46'N. 4°48'W. (Caernarvon)	Isle of May: 56°11'N. 2°33'W. (Fife)
Bradwell-on-Sea: 51°44'N. 0°54'E. (Essex)	Lundy: 51°12'N. 4°40'W. (Devon)
Calf of Man: 54°03'N. 4°49'W., Isle of Man	Portland Bill: 50°31'N. 2°27'W. (Dorset)
Copeland Islands: 54°40'N. 5°32'W. (Down)	Sandwich Bay: 51°17'N. 1°20'E. (Kent)
Dungeness: 50°55'N. 0°59'E. (Kent)	Skokholm: 51°42'N. 5°16'W. (Pembroke)
Fair Isle: 59°32'N. 1°37'W. (Shetland)	Slimbridge: 51°44'N. 2°25'W. (Gloucester)
Gibraltar Point: 53°06'N. 0°21'E. (Lincoln)	Spurn Point: 53°35'N. 0°06'E. (York)

Storm Petrel (*Hydrobates pelagicus*) (4; 5 miles; 7 years)

BA78008	f.g.	24.8.60	Foula: 60°08'N. 2°05'W. (Shetland)	PJM
	v	13.6.65	Lambhoga, Fetlar (Shetland)	55m. ENE.
651008	ad.	26.5.63	Annet: 49°54'N. 6°22'W. Isles of Scilly	SABO
	v.	10.5.65	Skokholm	135m. NNE.

Manx Shearwater (*Puffinus puffinus*) (113; 7⁹/₁₃ years)

Recoveries in South America are now an annual feature. Twelve were reported in 1965. Eight of these had been ringed as chicks on Skokholm between 17th August and 14th September, and were recovered on the coast of Brazil, latitude 22°49'S to 28°29'S, between 15th October and 14th December. Four are published in full, two from unusually far north, one from near the southern limit, and

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(EC 80681) which made an incredibly swift journey. The reporter of this last estimated that it had probably died two or three days before he found it. Recoveries in the eastern Atlantic are normally confined to the Bay of Biscay. n were reported off the west coast of France (April-September) and three off hernal Spain (two in September and one in October). The recovery in the ury Islands and those in African waters are without precedent.

646	pull. ()	31.8.60 (10.2.65)	Skomer: 51°44'N. 5°19'W. (Pembroke) MPH Aracati: 4 32'S. 37°45'W. (Ceará) Brazil
612	pull. ×	9.9.64 19.9.65	Skokholm Maceió: 9°40'S. 35°44'W. (Alagoas) Brazil
51	ad. × A	14.7.58 0.2.65	Skokholm Macedo: 37°15'S. 57°05'W. (Buenos Aires) Argentina
681	pull. ×	31.8.65 17.9.65	Skokholm Ponta da Enseada: 26°14'S. 48°31'W. (Santa Catarina) Brazil
584	pull. v	25.8.65 1.9.65	Skokholm Las Palmas: 28°08'N. 15°27'W. Canary Islands
233	pull. ×	2.9.65 27.9.65	Skokholm Cabo Bojador: 26°06'N. 14°33'W. Spanish West Africa
291	pull. ()	9.8.65 9.10.65	Skokholm Half Assini: 5°03'N. 2°53'W. Ghana

Fulmar (*Fulmarus glacialis*) (21; 4 $\frac{11}{12}$ years)

449	pull. ×	23.7.61 21.8.63	Noss: 60°08'N. 1°01'W. (Shetland) CJB Kirkja: 62°19'N. 6°18'W. (Fugloy) Faeroe Islands
549	pull. +	6.8.58 12.9.61	Foula: 60°08'N. 2°05'W. (Shetland) DRW off Frederikshåbs Isblink: 62°25'N. 50°40'W. Greenland
138	pull. /?/	6.8.64 27.5.65	Fair Isle off Tromsø: 72°15'N. 16°10'E. Norway
276	pull. ×	8.8.62 6.7.65	Eynhallow: 59°08'N. 3°08'W. (Orkney) AU off Fiskenaesset: c. 62°45'N. 51°00'W. (Frederikshåb) Greenland
11	pull. v	7.8.63 19.10.65	Eynhallow AU off NE. Newfoundland: c. 51°00'N. 54°00'W.
76	pull. +	11.8.64 19.8.65	Gairsay: 59°06'N. 2°59'W. (Orkney) AU Sydproven: 60°35'N. 45°40'W. (Julianehåb) Greenland

lition, six were recovered in the North Sea, two off the Netherlands (January arch), two off Denmark (July and September) and two off Norway (April and st).

Gannet (*Sula bassana*) (80; 6 $\frac{6}{12}$ years)

4	pull. /?/ c.	4.7.64 5.3.65	Bass Rock: 56°04'N. 2°38'W. (East Lothian) IVBP Gulf of Iskenderun: 36°40'N. 36°00'E. Turkey
9	pull. v	4.7.64 19.1.65	Bass Rock IVBP Dakar: 14°38'N. 17°27'W. Sénégal

annet is exceptional in the eastern Mediterranean and there are few recover- m as far south as Sénégal. Fifty-four other overseas recoveries from much nted waters will be tabulated in a future report.

Cormorant (*Phalacrocorax carbo*) (199; 10 $\frac{6}{12}$ years)

orants ringed in English, Welsh and southern Irish colonies were recovered

on the coasts of France (23) and north Spain (six), all except four occurring between October and March. Recoveries in British waters conform closely to the established pattern, there being 57 records of movements between 100 and 400 miles.

Shag (*Phalacrocorax aristotelis*) (374; $12\frac{5}{12}$ years)

No fewer than 148 of the recoveries occurred in November and December during which months there was some evidence of a wreck in eastern England. Those involved were all from the Farne Islands and the Firth of Forth colonies and the fact that there were also many local deaths of first-year birds suggests that the population was diseased. Ten were recovered in French waters (January, one; June, one; September, three; October, four; and November, one).

Heron (*Ardea cinerea*) (16; 40 miles; $6\frac{1}{12}$ years)

1042666	pull.	25.4.65	Gailey: $52^{\circ}42'N$. $2^{\circ}08'W$. (Stafford) C&PM
	+	14.11.65	Malpica de Bergantinos: $43^{\circ}19'N$. $8^{\circ}49'W$. (Coruña) Spain

Mallard (*Anas platyrhynchos*) (770; $8\frac{8}{12}$ years)

AJ49884	juv. ♂	21.9.62	Crowland: $52^{\circ}41'N$. $0^{\circ}11'W$. (Lincoln)
	+	4.12.65	Raymond: $49^{\circ}30'N$. $112^{\circ}41'W$. (Alberta) Canada
AJ83956	juv. ♂	26.9.63	Peakirk: $52^{\circ}38'N$. $0^{\circ}17'W$. (Northampton)
	+	16.8.65	České Budějovice: $49^{\circ}00'N$. $14^{\circ}30'E$. Czechoslovakia
AJ78271	f.g. ♂	29.12.62	Slimbridge
	+	4.3.65	Pratica di Mare: $41^{\circ}40'N$. $12^{\circ}29'E$. (Rome) Italy

The recovery in Alberta is astonishing. Previously, Ireland was the most western area from which British-ringed Mallard had been recovered and the possibility that AJ49884 reached Alberta by an east-about route cannot be discounted. Recoveries in Italy and Czechoslovakia are exceptional. A total of 118 recoveries in more customary foreign localities will be tabulated in a future report.

Teal (*Anas crecca*) (383; $13\frac{11}{12}$ years)

EC34756	ad. ♀	9.10.63	Abberton
	+	8.10.65	Măcin: $45^{\circ}15'N$. $28^{\circ}09'E$. (Galati) Romania
EC46619	juv. ♂	9.2.64	Abberton
	[?]	(8.1.65)	Schneegattern: $48^{\circ}02'N$. $13^{\circ}18'E$. (Ober Osterreich) Austria

These are, respectively, the second and first recoveries of Teal in Rumania and Austria. A total of 164 recoveries in more usual localities abroad will be tabulated in a future report.

Garganey (*Anas querquedula*) (5; 5 miles; $1\frac{9}{12}$ years)

Garganey ringed at Abberton were recovered as follows:

Ringed		Recovered	
EC34033	28.6.63	31.3.65	Le Crottoy: $50^{\circ}13'N$. $1^{\circ}38'E$. (Somme) France
EC46680	30.3.64	23.3.65	Condé sur l'Escaut: $50^{\circ}27'N$. $3^{\circ}36'E$. (Nord) France
EC46682	24.4.64	30.3.65	Rogerville: $49^{\circ}30'N$. $0^{\circ}16'E$. (Seine-Maritime) France
EC58060	23.7.65	(22.8.65)	Lauingen: $48^{\circ}33'N$. $10^{\circ}26'E$. (Bayern) Germany

Wigeon (*Anas penelope*) (32; $7\frac{3}{12}$ years)

Three Wigeon were recovered in France, three in Denmark, two in Finland and 14 in the U.S.S.R. These will be tabulated in a future report.

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Pintail (*Anas acuta*) (16; 200 miles; 4 $\frac{8}{12}$ years)

756	f.g. ♀	23.10.63	Mahee Island: 54°30'N. 5°39'W. (Down) PPM
	+	2.1.65	Gruissan: 43°07'N. 3°06'E. (Aude) France
274	f.g. ♂	14.2.65	Mahee Island PPM
	+	29.10.65	Oland: 54°41'N. 8°43'E. North Frisian Islands, Germany
3888	ad. ♀	17.11.64	Abberton
	+	18.5.65	Sizyabsk: 65°04'N. 53°47'E. (Komi) U.S.S.R.
1003	f.g. ♀	15.1.60	Slimbridge
	/?/	30.9.64	Ust-Kulom: 61°45'N. 53°42'E. (Komi) U.S.S.R.
3342	juv. ♀	18.9.62	Slimbridge
	+	0.1.65	Coria del Rio: 37°16'N. 6°06'W. (Sevilla) Spain
1596	f.g. ♂	10.2.64	Slimbridge
	+	25.8.65	Mariager Fjord: c. 56°42'N. 10°15'E. (Jylland) Denmark
986	ad. ♂	5.1.64	Abbotsbury: 50°40'N. 2°36'W. (Dorset)
	+	21.12.64	St. Valery: 50°11'N. 1°38'E. (Somme) France
611	f.g. ♀	16.1.64	Abbotsbury
	+	0.1.65	Almenara: 39°46'N. 0°14'W. (Castellón) Spain

Shoveler (*Anas clypeata*) (16; 60 miles; 4 $\frac{1}{12}$ years)

Shovelers ringed at Peakirk, Abberton and Slimbridge were recovered as follows:

—Ringed—			—Recovered—	
Peakirk				
77	25.11.61	c. 31.12.64	Almenara: 39°46'N. 0°14'W. (Castellón) Spain	
364	26.9.63	18.3.65	St. Agnant: 45°53'N. 0°58'W. (Charente-Maritime) France	
376	31.7.64	7.12.64	Berek-sur-Mer: 50°24'N. 1°35'E. (Pas-de-Calais) France	
Abberton				
167*	10.6.63	1964	Karlovka: 49°29'N. 35°09'E. (Poltava) U.S.S.R.	
170	16.7.63	4.11.65	Lourdes: 43°06'N. 0°03'W. (Hautes-Pyrénées) France	
16†	4.6.65	5.9.65	Krummenhagen: 54°15'N. 13°02'E. (Mecklenburg) Germany	
169	17.8.64	0.8.65	Cherdyn': 60°25'N. 56°30'E. (Perm) U.S.S.R.	
Slimbridge				
188	14.12.63	23.8.64	'114 km. from Leningrad' U.S.S.R.	
192	7.1.64	11.11.65	Lacanau-Ville: 44°59'N. 1°05'W. (Gironde) France	
183*	4.3.64	15.9.64	Mytishechi: 55°55'N. 37°47'E. (Moscow) U.S.S.R.	
198*	2.10.64	28.3.65	near Péronne: 49°50'N. 2°55'E. (Somme) France	

*Ringed as adult; †ringed as pullus; the remainder were ringed as juveniles

Scaup (*Aythya marila*) (1; 1 year)

39	ad. ♀	23.2.63	Newburgh: 57°19'N. 2°01'W. (Aberdeen) AU
	×	0.3.64	Fehmarn: c. 54°30'N. 11°15'E. (Schleswig-Holstein) Germany

Tufted Duck (*Aythya fuligula*) (9; 20 miles; 5 $\frac{1}{12}$ years)

Tufted Ducks ringed at Abberton were recovered as follows:

—Ringed—			—Recovered—	
156	29.5.63	1.5.65	Åland Islands: c. 60°20'N. 20°00'E. Finland	
157	29.5.63	26.4.65	Kinzel: 53°14'N. 50°38'E. (Kuybyshev) U.S.S.R.	
82*	1.10.64	1.11.64	Fontaine: 50°02'N. 1°56'E. (Somme) France	
84	1.10.64	18.12.65	Wilton, Marlborough (Wiltshire) 105m. WSW.	
106	28.3.65	0.9.65	Kalliojärvi: 66°10'N. 29°24'E. (Oulu) Finland	

*Ringed as juvenile female; the remainder were ringed as adult males



MAP 1. Recoveries of British-ringed birds in North America and Greenland during 1909-6
(key opposite) (drawn by R. C. Faulkner)

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Pochard (*Aythya ferina*) (5; 60 miles; 4 $\frac{7}{12}$ years)

4265	juv. ♀	4.1.61	Abberton
	+	28.8.65	Øland: 57°04'N. 9°36'E. (Jylland) Denmark
07327	ad. ♂	25.9.64	Abberton
	+	6.11.65	Stadil Fjord: 56°10'N. 8°13'E. (Jylland) Denmark

Goldeneye (*Bucephala clangula*) (2; 200 miles; 1 $\frac{11}{12}$ years)

0329	1st W. ♂	20.1.64	Newburgh: 57°19'N. 2°01'W. (Aberdeen) AU
	+	28.11.65	Marstrand: 57°54'N. 11°35'E. (Göteborg) Sweden

Shelduck (*Tadorna tadorna*) (9; 25 miles; 2 $\frac{3}{12}$ years)

32	ad. ♂	20.2.62	Newburgh: 57°19'N. 2°01'W. (Aberdeen) AU
	×	13.2.65	Sandouville: 49°30'N. 0°19'E. (Seine-Maritime) France
6852	ad. ♂	3.1.64	Newburgh AU
	×	(24.8.65)	Caerlaverock (Dumfries) 170m. SSW.

Grey Lag Goose (*Anser anser*) (27; 6 $\frac{1}{12}$ years)

051	f.g. ♂	15.11.63	Coupar Angus: 56°33'N. 3°17'W. (Perth)
	+	5.11.65	Lista: 58°07'N. 6°40'E. (Vest Agder) Norway

is only the second Norwegian recovery of a British-ringed Grey Lag Goose. The others were recovered in Iceland (two April 1965, one September 1965).

White-fronted Goose (*Anser albifrons*) (7; 10 $\frac{8}{12}$ years)

White-fronted Geese ringed at Slimbridge were recovered as follows:

Ringed			Recovered
03	15.2.53	5.11.63	Altenpleen: 54°21'N. 12°56'E. (Mecklenburg) Germany
219	21.2.58	8.5.65	Kirov: 58°38'N. 49°39'E. U.S.S.R.
158	9.3.59	0.12.62	Rügen: c. 54°25'N. 13°20'E. (Mecklenburg) Germany
338	9.3.59	15.12.65	Satow: 53°24'N. 12°23'E. (Mecklenburg) Germany
513*	6.3.62	2.5.65	Maksatikha: 57°48'N. 35°53'E. (Kalinin) U.S.S.R.
551	6.3.62	16.10.65	Prohn: 54°23'N. 13°03'E. (Mecklenburg) Germany
556*	6.3.62	24.4.65	Uglich: 57°31'N. 38°20'E. (Yaroslavl) U.S.S.R.

*Ringed as juveniles; the remainder were ringed as adults

Pink-footed Goose (*Anser fabalis brachyrhynchus*) (78; 13 $\frac{5}{12}$ years)

105	ad.	15.10.58	Dunning: 56°18'N. 3°36'W. (Perth)
	+	0.10.63	Hodne: 58°46'N. 5°33'E. (Rogaland) Norway

is only the fourth Norwegian recovery of a British-ringed Pink-footed Goose, the other three also occurring in 1963. One was also recovered in Iceland in September.

KEY TO MAP 1 (with the number of recoveries of each species in brackets)

Common Shearwater <i>Puffinus puffinus</i> (2)	J Snow Bunting <i>Plectrophenax nivalis</i> (1)
Common Fulmar <i>Fulmarus glacialis</i> (21)	K Pink-footed Goose <i>Anser fabalis</i>
Common Murre <i>Anas platyrhynchos</i> (1)	<i>brachyrhynchus</i> (21)
Common Murre <i>Anas crecca</i> (1)	L Arctic Skua <i>Stercorarius parasiticus</i> (1)
Common Plover <i>Vanellus vanellus</i> (1)	M Knot <i>Calidris canutus</i> (3)
Common Stone <i>Arenaria interpres</i> (3)	N Purple Sandpiper <i>Calidris maritima</i> (1)
Common Skua <i>Stercorarius skua</i> (10)	O Kittiwake <i>Rissa tridactyla</i> (75)
Common Gull <i>Fratercula arctica</i> (3)	P Ringed Plover <i>Charadrius hiaticula</i> (1)

Canada Goose (*Branta canadensis*) (36; $9\frac{5}{12}$ years)

5020651	f.g.	27.6.64	Beaulieu: $50^{\circ}47'N$. $1^{\circ}27'W$. (Hampshire)
	+	31.3.65	Attin: $50^{\circ}29'N$. $1^{\circ}45'E$. (Pas-de-Calais) France
5020696	f.g.	27.6.64	Beaulieu
	+	21.9.64	Woignarue: $50^{\circ}08'N$. $1^{\circ}32'E$. (Somme) France

The only previous French recoveries of British-ringed Canada Geese were reported during the cold weather of 1963. In addition to the above, there were several movements indicative of moult migration between Yorkshire and the Beaulieu Firth, Inverness, and one movement from Beaulieu to Anglesey.

Mute Swan (*Cygnus olor*) (849; $5\frac{9}{12}$ years)

Z10930	2ndW.	9.2.63	Staines: $51^{\circ}26'N$. $0^{\circ}31'W$. (Middlesex) MB
	× A	5.8.65	Fehmarn: $54^{\circ}31'N$. $11^{\circ}12'E$. (Schleswig-Holstein) Germany

Four Mute Swans controlled on 1st July at Barrow-in-Furness, Lancashire, have been ringed as follows:

Z17168	juv.	1.1.65	Putney: $51^{\circ}28'N$. $0^{\circ}14'W$. (Surrey) H&S (= 215m. NW.)
Z17258	juv.	6.3.65	Oxford: $51^{\circ}45'N$. $1^{\circ}15'W$. PJW
	v	20.5.65	Erdington: $52^{\circ}32'N$. $1^{\circ}48'W$. (Warwick)
Z15450	pull.	11.7.64	Oxford CMR (= 180m. NW.)
Z15887	juv.	17.1.65	Oxford PJW

Swans congregate at Barrow-in-Furness because the waters of the Cavendish Dock there are warmed by the outflow from a power station and this leads to luxuriant algal growth which provides excellent feeding.

Sparrowhawk (*Accipiter nisus*) (10; 25 miles; $3\frac{4}{12}$ years)

2007432	1stW. ♂	19.4.64	Grune Point: $54^{\circ}54'N$. $3^{\circ}21'W$. (Cumberland) RS
	×	2.4.65	Gullane (East Lothian) 80m. N.

Hen Harrier (*Circus cyaneus*) (6; $5\frac{10}{12}$ years)

One nestling from Orkney was recovered in Inverness in April and one from Argyll was reported in Co. Cork in March.

Merlin (*Falco columbarius*) (4; 40 miles; $1\frac{7}{12}$ years)

AT77952	pull.	18.6.64	near Sedbergh: $54^{\circ}21'N$. $2^{\circ}34'W$. (York) PJM
	[?]	1.10.65	Asteasu: $43^{\circ}11'N$. $2^{\circ}06'W$. (Guipúzcoa) Spain

This is the first recovery of a British-ringed Merlin in Iberia.

Kestrel (*Falco tinnunculus*) (48; 150 miles; $5\frac{1}{12}$ years)

3100839	pull.	21.6.65	Stenness: $59^{\circ}00'N$. $3^{\circ}15'W$. Pomona (Orkney) EB
	×	23.11.65	Wedel: $53^{\circ}35'N$. $9^{\circ}42'E$. (Hamburg) Germany
360976	pull.	2.7.65	Kimbleworth: $54^{\circ}48'N$. $1^{\circ}36'W$. (Durham) JCC
	+	21.11.65	Moreton Morrell (Warwick) 180m. S.
3100724	pull.	22.6.65	Cautley: $54^{\circ}22'N$. $2^{\circ}29'W$. Sedbergh (York) SS
	×	10.9.65	Sudborough (Northampton) 150m. SSE.
EC51780	pull.	21.6.65	Slaidburn: $54^{\circ}00'N$. $2^{\circ}30'W$. (York) W&M
	×	c. 29.10.65	Molland (Devon) 210m. SSW.
SS44108	pull.	30.6.65	Long Mynd: $52^{\circ}32'N$. $2^{\circ}52'W$. Church Stretton (Shropshire) PJM
	v	24.8.65	Campsie (Londonderry) 245m. NW.

There is only one previous recovery of a British-ringed Kestrel in Germany.

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Quail (*Coturnix coturnix*) (1; $\frac{4}{12}$ year)

5993 ad. ♀ 3.5.65 Ewhurst: 51°09'N. 0°26'W. Cranleigh (Surrey) L&JW
 + 15.9.65 Torres de Berrellén: 41°45'N. 1°04'W. (Zaragoza) Spain

is the first recovery of a British-ringed Quail.

Moorhen (*Gallinula chloropus*) (30; 30 miles; 6- $\frac{6}{12}$ years)

1336 1stW. 7.12.64 Newburgh: 57°19'N. 2°01'W. (Aberdeen) AU
 × 17.6.65 Vollenhove: 52°41'N. 5°58'E. (Overijssel) Netherlands
 680 f.g. 6.12.64 Duddingston Loch: 55°56'N. 3°09'W. (Midlothian) DRA
 v 18.7.65 Lyngballe: 56°13'N. 9°56'E. (Jylland) Denmark
 618 1stW. 28.12.63 Portavo: 54°39'N. 5°34'W. Bangor (Down) CBO
 × 6.4.65 Arnadale (West Lothian) 115m. NE.
 512 ad. 25.1.65 Winchester: 51°04'N. 1°19'W. (Hampshire) WC
 () 20.4.65 Neeede: 52°08'N. 6°36'E. (Gelderland) Netherlands

Coot (*Fulica atra*) (10; 120 miles; 3- $\frac{5}{12}$ years)

3426 juv. 28.8.65 Abberton
 + 2.11.65 Parentis-en-Born: 44°21'N. 1°04'W. (Landes) France
 3442 juv. 3.9.65 Abberton
 + 7.12.65 Incheville: 50°01'N. 1°30'E. (Seine-Maritime) France
 902 f.g. 12.2.63 Shrawley: 52°17'N. 2°17'W. (Worcester) WT
 × A 5.4.65 Scharsterbrug: 52°57'N. 5°46'E. (Friesland) Netherlands

Oystercatcher (*Haematopus ostralegus*) (157; 8- $\frac{10}{12}$ years)

1309 pull. 8.8.61 Foula: 60°08'N. 2°05'W. (Shetland) BEG
 × (14.5.65) Karmoy: 59°20'N. 5°15'E. (Rogaland) Norway
 774 pull. 4.7.63 Scolt Head: 52°59'N. 0°44'E. (Norfolk) RC
 × 18.4.65 Den Helder: 52°58'N. 4°46'E. (Noord-Holland) Netherlands

Sign recoveries of winter-trapped Oystercatchers and distant recoveries within 100 miles (over 100 miles) are summarised in table A.

Table A—Countries and months of recoveries of Oystercatchers

Country of recovery	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Britain												
NE (30)	2	2	5	4	3	4	4	4	1	—	1	—
SW (10)	—	3	3	—	—	1	—	—	1	1	—	1
1 (6)	—	—	—	1	1	4	—	—	—	—	—	—
(1)	—	—	1	—	—	—	—	—	—	—	—	—
(9)	—	—	—	—	1	3	3	2	—	—	—	—
(2)	—	—	—	—	—	—	—	1	—	—	—	1

The tables A-P are subject to error in cases where it has been necessary to assume that the first recovery was approximately that of the letter reporting it, whereas the bird may have been dead for some time before being found

Lapwing (*Vanellus vanellus*) (46; 9- $\frac{10}{12}$ years)

10 pull. 15.5.64 Lowgill: 54°22'N. 2°35'W. (Westmorland) ANS
 + 3.1.65 Tangier: 35°49'N. 5°52'W.
 1 juv. 2.9.59 Stoke Bardolph: 52°59'N. 1°02'W. (Nottingham) JASB
 + 0.10.64 Kunya: 56°18'N. 31°00'E. (Pskov) U.S.S.R.
 53 juv. 10.8.64 near Sutton Bridge: 52°44'N. 0°11'E. (Lincoln) JAH
 [/?] 25.1.65 near Sidi Moussa: c. 33°00'N. 8°50'W. Morocco

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2069561	pull. /?/	30.5.64 1.2.65	Walcot: 52°42'N. 2°32'W. (Shropshire) JML Casablanca: 33°31'N. 7°40'W. Morocco
2038577	pull. /?/	31.5.62 early 2.65	Grove Ferry: 51°19'N. 1°13'E. (Kent) SBBO Ben Slimane: 33°37'N. 7°06'W. (Casablanca) Morocco
2037617	ad. ♀ +	29.10.61 27.12.64	East Tilbury: 51°28'N. 0°26'E. (Essex) VSW (Pavia) c. 45°10'N. 9°00'E. Italy
2011071	f.g. +	15.12.64 10.5.65	Kemsley Marsh: 51°23'N. 0°43'E. Sittingbourne (Kent) MKRG Zenkovo: 61°12'N. 69°49'E. (Tumen) U.S.S.R.

It is curious that four Lapwings should have been reported from Africa in the same year, for there were only six records in the previous 55 years (1914, 1939, two in 1954, 1960 and 1962). There are only three other recoveries of British ringed Lapwings in Italy and four in the U.S.S.R. 2011071 is the most easterly one yet reported. Only one Lapwing moved from Great Britain to Ireland. The remaining foreign recoveries are summarised in table B.

Table B—Countries and months of recoveries of Lapwings

Country of recovery	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
France (5)	1	3	—	—	—	—	—	—	—	—	—	1
Spain (11)	6	5	—	—	—	—	—	—	—	—	—	—
Portugal (6)	3	2	—	1	—	—	—	—	—	—	—	—

See footnote to table A

Ringed Plover (*Charadrius hiaticula*) (8; 40 miles; 3 years)

638677	1st W. +	24.8.65 7.9.65	Fair Isle near Cabourg: 49°16'N. 0°12'W. (Calvados) France
CK38054	ad. v	16.12.63 10.5.65	Inishkea Islands: 54°08'N. 10°13'W. (Mayo) DC Spurn Point 415m. E.
629857	juv. +	31.8.61 3.9.64	Abberton Noyelles sur Mer: 50°13'N. 1°43'E. (Somme) France
BB01534	ad. v	6.9.63 22.8.65	Cliffe: 51°28'N. 0°30'E. (Kent) NKRK Jurmo: 59°50'N. 21°37'E. (Turku-ja-Pori) Finland
60900S	ad. /?/	22.8.62 5.6.64	Perry Oaks: 51°28'N. 0°29'W. (Middlesex) TRG Umigtuarssuit: 65°55'N. 38°00'W. (Angmagssalik) Greenland

The recoveries in Greenland and Finland are without precedent. CK38054 is of more than usual interest because it was proved to be breeding at Spurn.

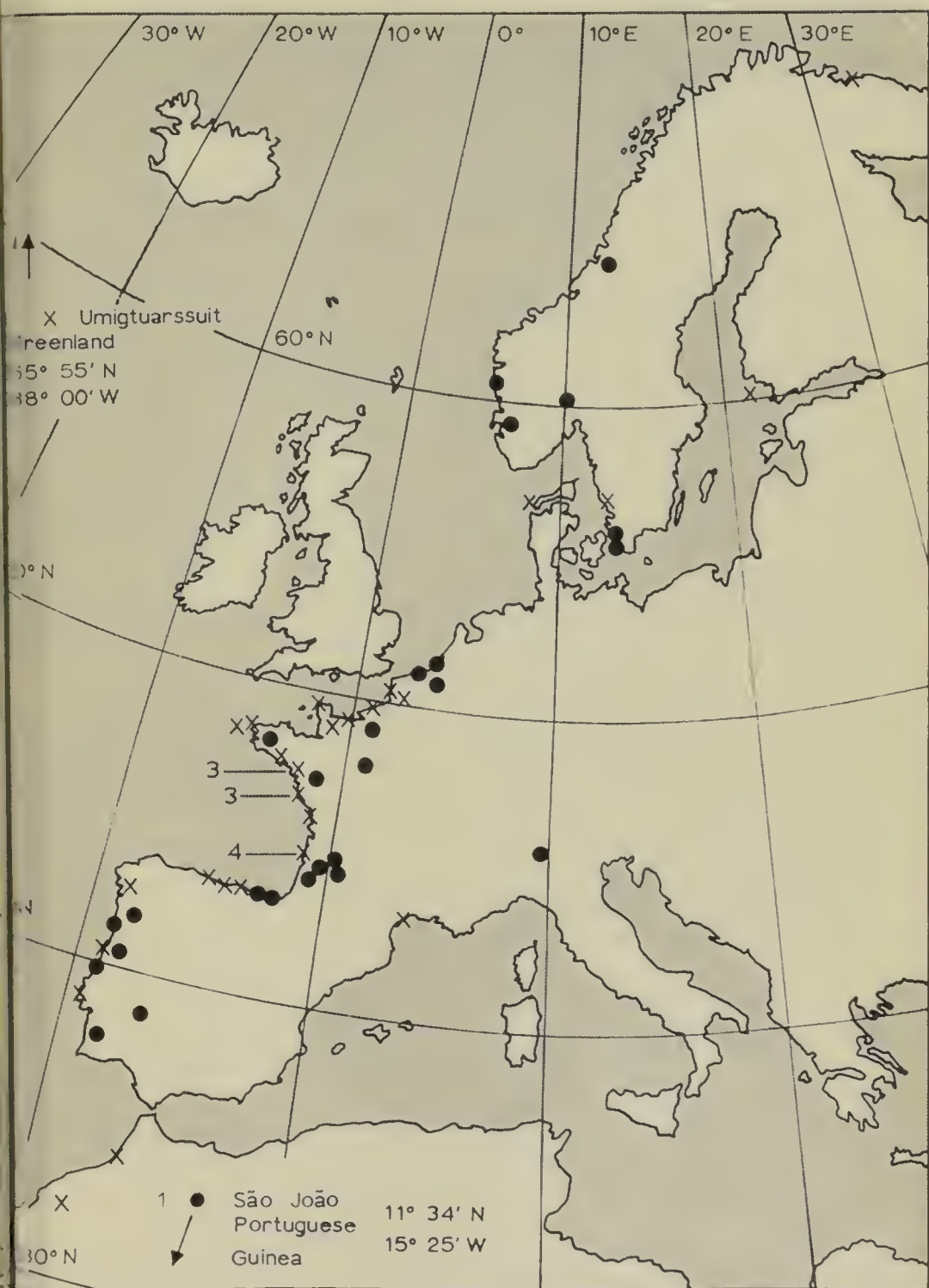
Golden Plover (*Pluvialis apricaria*) (3; 3 $\frac{3}{12}$ years)

2073920	f.g. ×	29.10.64 28.2.65	Cockerham: 53°58'N. 2°50'W. (Lancashire) MBRG St. Thomas de Cónac: 45°24'N. 0°40'W. (Charente-Maritime) France
2068148	f.g. × A	15.2.64 16.4.65	Benington: 53°00'N. 0°05'E. (Lincoln) CMR Brattingsborg: 55°47'N. 10°35'E. Samsø Denmark
PI2078	f.g. ×	9.12.61 7.3.65	Harty: 51°22'N. 0°55'E. Sheppey (Kent) SWG Talarrubias: 39°03'N. 5°14'W. (Badajóz) Spain

Snipe (*Gallinago gallinago*) (30; 200 miles; 6 $\frac{2}{12}$ years)

V26036	f.g. +	30.7.60 1.9.65	Arthington: 53°54'N. 1°36'W. (York) AHBL Glenferness (Nairn) 260m. NNW.
CX52151	f.g. /?/	28.8.64 (11.2.65)	Stoke: 51°27'N. 0°38'E. (Kent) NKRK Recess (Galway) 450m. WNW.

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All foreign recoveries of Ringed Plover *Charadrius hiaticula* (X) and Common Sandpiper *Tringa hypoleucos* (●) (drawn by R. C. Faulkner)

CA14509 f.g. 20.12.63 Earlswood: 51°12'N. 0°11'W. (Surrey) RLR
 + 21.8.65 Lesozovodskiy: 66°33'N. 33°00'E. (Murmansk) U.S.S.R.

CA14509 is much further north-east than any previous recovery of a British-ring Snipe. Fourteen other recoveries (France, six; Spain, three; Portugal, one; Denmark, three; and U.S.S.R., one) will be tabulated in a future report.

Woodcock (*Scolopax rusticola*) (2; 30 miles; 1 $\frac{2}{12}$ years)

2078923 f.g. 18.1.64 Kesgrave: 52°05'N. 1°13'E. Ipswich (Suffolk) PRC
 + 2.4.65 Store Nustrup: 55°16'N. 9°11'E. (Jylland) Denmark

Curlew (*Numenius arquata*) (23; 60 miles; 6 $\frac{7}{12}$ years)

3066873 pull. 8.6.64 Carrbridge: 57°17'N. 3°48'W. (Inverness) AS
 + (25.2.65) Rossbeigh (Kerry) 430m. SW.
 SS30003 pull. 5.6.65 Rothiemurchus: 57°09'N. 3°50'W. (Inverness)
 × (31.7.65) Ballymoe (Galway) 300m. SW.
 AT66505 f.g. 18.8.59 Terrington Marsh: 52°47'N. 0°17'E. (Norfolk) WWRG
 + 5.8.65 Kjaergård: 56°11'N. 8°33'E. (Jylland) Denmark
 AT66574 f.g. 18.8.59 Terrington Marsh WWRG
 × 1.8.65 Ringkøbing Fjord: c. 56°00'N. 8°10'E. (Jylland) Denmark
 AT78043 f.g. 8.2.64 Snettisham: 52°53'N. 0°30'E. (Norfolk) C&PM
 × 13.7.65 Östra Norrskär: 63°07'N. 20°40'E. Finland
 3083944 f.g. 17.2.62 Stoke: 51°27'N. 0°38'E. (Kent) NKRK
 × 9.6.65 Kangasjärvi: 61°57'N. 30°17'E. (Pohjois-Karjala) Finland

Whimbrel (*Numenius phaeopus*) (2; 3 years)

EC28169 f.g. 5.8.62 Stoke: 51°27'N. 0°38'E. (Kent) NKRK
 + 9.5.65 Onega: 63°55'N. 38°06'E. (Arkhangel) U.S.S.R.
 3026451 f.g. 24.4.60 St. Agnes
 + 20.4.63 Pointe de la Coubre: 45°40'N. 1°16'W. (Charente-Maritime) France

EC28169 is the first recovery of a British-ringed Whimbrel in the U.S.S.R.

Bar-tailed Godwit (*Limosa lapponica*) (2; 10 miles; 13 days)

EC45229 1st W. ♀ 29.8.65 Fair Isle
 + 10.9.65 Ejersted: 57°18'N. 9°40'E. (Jylland) Denmark

Green Sandpiper (*Tringa ochropus*) (2; 5 miles; 3 $\frac{4}{12}$ years)

710906 juv. 11.8.61 Abberton
 + 20.12.64 Las Cabezas de San Juan: 36°59'N. 5°56'W. (Sevilla) Spain

Common Sandpiper (*Tringa hypoleucos*) (7; 100 miles; 7 $\frac{10}{12}$ years)

BA85183 f.g. 22.7.65 Hoddesdon: 51°47'N. 0°00' (Hertford) RMRG
 + 8.8.65 Baie de l'Orne: 49°17'N. 0°14'W. (Calvados) France

Common Sandpipers ringed at Abberton were recovered as follows:

Ringed		Recovered	
V34467	22.9.57	30.7.65	Skanör: 55°25'N. 12°50'E. (Malmöhus) Sweden
BBo1200	4.9.63	8.8.65	Skanör, Sweden
BBo1205*	24.9.63	0.7.65	Koudekerke: 51°29'N. 3°33'E. (Zeeland) Netherlands
BA68275	10.5.65	(13.5.65)	Wetherby (York) 170m. NW.

*Ringed as juvenile; the remainder were ringed as adults

These are the first Swedish recoveries of British-ringed Common Sandpipers.

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Redshank (*Tringa totanus*) (20; 25 miles; 6 $\frac{7}{12}$ years)

1703	pull.	2.6.65	Sanquhar: 55°22'N. 3°56'W. (Dumfries) NSRG
	x	1.8.65	Agon: 49°02'N. 1°34'W. (Manche) France
00	ad.	23.12.58	Hilbre: 53°23'N. 3°14'W. (Cheshire) JCG
	x	(6.8.65)	near Leuchars (Fife) 200m. N.
0030	juv.	23.6.63	Sandbach: 53°09'N. 2°22'W. (Cheshire) G & W
	x	(4.3.65)	Newlyn (Cornwall) 250m. SW.
7083	pull.	21.5.64	Scolt Head: 52°59'N. 0°44'E. (Norfolk) RC
	+	28.3.65	Agon, France
811	juv.	17.8.63	Holbeach Marsh: 52°54'N. 0°04'E. (Lincoln) C & PM
	[?]	17.12.63	L'Aiguillon: 46°20'N. 1°18'W. (Vendée) France
605	pull.	15.5.65	Newport Pagnell: 52°05'N. 0°44'W. (Buckingham) HMG
	v	30.6.65	Abberton 67m. E.
	+	29.8.65	Metras: 44°38'N. 1°04'W. (Gironde) France
5450	f.g.	10.7.64	Chetney Marsh: 51°26'N. 0°44'E. (Kent) MKRG
	[?]	2.1.65	St. Ciers: 45°18'N. 0°36'W. (Gironde) France

the early departure of DS19605 from inland breeding grounds.

Knot (*Calidris canutus*) (8; 10 miles; 2 $\frac{3}{12}$ years)

928	ad.	5.12.64	Benington: 53°00'N. 0°05'E. (Lincoln) JAH
	+	1.8.65	Vaernet: 55°53'N. 8°14'E. (Jylland) Denmark
331	juv.	3.9.63	Holbeach Marsh: 52°54'N. 0°04'E. (Lincoln) WWRG
	()	19.4.65	Pointe d'Arcachon: 44°33'N. 1°15'W. (Gironde) France
972	juv.	3.9.63	Holbeach Marsh WWRG
	+	12.6.65	Umanak: 70°40'N. 52°00'W. Greenland
556	juv.	6.7.63	Holbeach Marsh WWRG
	+	15.5.65	Sanlucar: 36°46'N. 6°21'W. (Cádiz) Spain

Purple Sandpiper (*Calidris maritima*) (1; 5 $\frac{8}{12}$ years)

1-	f.g.	7.2.59	Hilbre: 53°23'N. 3°14'W. (Cheshire) JCG
	+	27.10.64	Augpilagtoq: 60°20'N. 44°25'W. (Nanortalik) Greenland

is the first recovery of a British-ringed Purple Sandpiper.

Little Stint (*Calidris minuta*) (2; 5 miles; 5 days)

123	f.g.	7.9.65	Dungeness
	+	11.9.65	Baie de Somme: 50°14'N. 1°33'E. (Somme) France

Dunlin (*Calidris alpina*) (106; 150 miles; 6 $\frac{4}{12}$ years)

23	f.g.	27.7.65	Tarbat Ness: 57°52'N. 3°46'W. (Ross) AJW
	v	15.8.65	Harty, Sheppey (Kent) 480m. SE.

Table C—Countries and months of recoveries of Dunlin

of recovery	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(1)	-	-	-	-	-	-	-	-	1	-	-	-
(1)	-	-	1	-	-	-	-	-	-	-	-	-
(5)	-	1	2	2	1	-	1	2	1	3	1	1
ids (1)	-	-	-	-	-	1	-	-	-	-	-	-
(3)	-	-	-	-	2	-	-	-	1	-	-	-
)	-	-	-	-	-	-	2	-	-	-	-	-
45)	-	-	-	-	-	-	11	24	-	-	-	-
i)	-	-	-	-	3	-	1	-	-	-	-	-
(1)	-	-	-	-	-	-	-	-	1	-	-	-

See footnote to table A

The remarkable thing about table C is that no fewer than 43 of the 66 recoveries listed were controlled, one each in France and Germany, two in Poland, four in Finland and 35 in Sweden. This represents international co-operation of a high order.

Ruff (*Philomachus pugnax*) (6; 5 miles; 4 $\frac{8}{12}$ years)

P14523	ad. ♂	27.8.60	Bamburgh: 55°36'N. 1°42'W. (Northumberland)	PRE
	×	2.5.65	Limmen: 52°34'N. 4°41'E. (Noord-Holland)	Netherlands
04173R	f.g.	1.9.62	Stoke Bardolph: 53°00'N. 1°02'W. (Nottingham)	HB
	+	7.3.65	Cologna Veneta: 45°19'N. 11°23'E. (Verona)	Italy
DS00099	juv. ♂	15.9.62	near Sutton Bridge: 52°44'N. 0°11'E. (Lincoln)	C&PM
	+	2.3.65	River Tagus estuary: c. 38°50'N. 9°00'W.	Portugal
DS15076	juv. ♂	23.8.64	near Sutton Bridge	C&PM
	+	17.1.65	Casablanca: 33°39'N. 7°35'W.	Morocco
2068132	1stW. ♂	23.10.63	Abingdon: 51°41'N. 1°17'W. (Berkshire)	CMR
	+	17.7.65	Fort Vert: 50°58'N. 1°56'E. (Pas-de-Calais)	France

Arctic Skua (*Stercorarius parasiticus*) (4; 30 miles; 6 $\frac{1}{12}$ years)

EC28854	pull.	9.7.63	Fair Isle	
	×	17.5.65	Barra de Santo Antonio: 9°24'S. 35°30'W. (Alagoas)	Brazil
3075539	pull.	7.7.59	Fair Isle	
	×	17.8.65	Skeffling (York) 410m. S.	

EC28854 is the first British-ringed bird other than a Manx Shearwater to be recovered in South America. There is a well-marked passage of Arctic Skuas down the east coast of South America, most of them probably coming from New World breeding grounds.

Great Skua (*Stercorarius skua*) (23; 100 miles; 5 years)

416262	pull.	2.8.61	Foula: 60°08'N. 2°05'W. (Shetland)	BEG
	+	8.6.65	Sumbø: 61°24'N. 6°42'W. (Suderoy)	Faeroe Islands
421046	pull.	25.7.63	Foula	BEG
	/?/	summer 1965	Holsteinsborg district: c. 67°00'N. 53°30'W.	Greenland
421903	pull.	13.7.65	Foula	BEG
	×	0.9.65	Owenroe Island, Lough Neagh (Armagh)	410m. SSW.
HW01664	pull.	8.8.65	Foula	BEG
	×	22.11.65	Louzac: 45°43'N. 0°25'W. (Charente)	France

Rather surprisingly, 416262 is only the second British-ringed Great Skua reported from the Faeroe Islands. The recovery locality of HW01664 is near Cognac, and well inland. The remaining foreign recoveries are summarised in table D.

Table D—Countries and months of recoveries of Great Skuas

Country of recovery	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Netherlands (1)	—	—	—	—	—	—	1	—	—	—	—	—
France (11)	2	—	—	1	1	—	—	—	1	—	2	—
Spain (2)	1	—	—	—	—	—	—	—	—	—	—	—

See footnote to table A

Great Black-backed Gull (*Larus marinus*) (45; 9 $\frac{6}{12}$ years)

AJ16241	1stW.	11.11.60	Fair Isle	
	×	25.6.65	Borkenes: 68°47'N. 16°11'E. (Troms)	Norway

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87	pull.	22.6.64	Rosevear: 49°52'N. 6°24'W. Isles of Scilly SABO
	×	4.11.65	St. Guénolé: 47°49'N. 4°22'W. (Finistère) France
0618	pull.	29.6.65	Rosevear SABO
	×	30.8.65	Quiberon: 47°29'N. 3°07'W. (Morbihan) France

✓ six recoveries within the British Isles showed movements greater than 100 s.

Lesser Black-backed Gull (*Larus fuscus*) (183; 8½ years)

068	pull.	9.8.63	Farne Islands: 55°37'N. 1°37'W. (Northumberland) ND&N
	v	29.1.64	Sidi Ifni: 29°24'N. 10°12'W. Spanish West Africa
	+	11.1.65	Las Cabezas: 36°59'N. 5°56'W. (Sevilla) Spain
6067	pull.	6.7.64	Walney: 54°05'N. 3°15'W. (Lancashire) MBRG
	×	11.5.65	Wittlage: 52°19'N. 8°22'E. (Niedersachsen) Germany
6454	pull.	31.7.64	Walney MBRG
	×	27.6.65	De Beer: 51°58'N. 4°06'E. (Zuid-Holland) Netherlands
1294	pull.	28.8.64	Walney RGBB
	×	3.7.65	Assendelft Polder: 52°30'N. 4°45'E. (Noord-Holland) Netherlands

Further 85 foreign recoveries have been held over for tabulation in a future report.

Herring Gull (*Larus argentatus*) (247; 15½ years)

268	ad.	13.12.61	Fair Isle
	/?/	28.6.65	Skarsfjord: 69°58'N. 18°49'E. (Troms) Norway
161	pull.	4.7.64	Fair Isle
	×	c. 20.4.65	Hoogwoud: 52°44'N. 4°56'E. (Noord-Holland) Netherlands
201	pull.	2.7.62	Puffin Island: 53°19'N. 4°01'W. (Anglesey) C&T
	×	autumn 1965	Ugjesteroed: 59°36'N. 10°41'E. (Akershus) Norway

In addition to the above, four ringed as pulli were recovered in France. Thirty-recoveries within the British Isles showed movements greater than 100 miles.

Common Gull (*Larus canus*) (16; 130 miles; 6½ years)

7	f.g.	10.2.59	Duddingston Loch: 55°56'N. 3°09'W. (Midlothian) DRA
	+	20.7.65	Hyen: 61°45'N. 5°55'E. (Sogn-og-Fjordane) Norway
99	ad.	1.4.64	Benington: 53°00'N. 0°05'E. (Lincoln) WAC
	×	19.6.65	Randaberg: 59°00'N. 5°38'E. (Rogaland) Norway
87	1stW.	3.3.63	Rainham: 51°31'N. 0°12'E. (Essex) CEJC
	×	(11.6.65)	Naustdal: 61°31'N. 5°43'E. (Sogn-og-Fjordane) Norway
26	2ndW.	26.1.64	Rainham CEJC
	×	(31.3.65)	near Malmö: c. 55°40'N. 13°05'E. (Malmöhus) Sweden

Black-headed Gull (*Larus ridibundus*) (252; 14 years)

English and Irish recoveries of Black-headed Gulls ringed as pulli are given in full. The summarises recoveries of winter-caught ones reported during 1964 and

69	pull.	5.7.64	Blanchland: 54°51'N. 2°03'W. (Northumberland) PB&W
	×	12.1.65	Ballyduff (Waterford) 310m. SW.
42	pull.	16.6.63	Ravenglass: 54°21'N. 3°25'W. (Cumberland) WP&M
	+	21.2.65	Golegã: 39°24'N. 8°29'W. (Ribatejo) Portugal

BRITISH BIRDS

SS44357	pull. ×	25.6.65 0.11.65	Horsey Island: 51°51'N. 1°16'E. (Essex) JKW Inchicore (Dublin) 325m. WNW.
EC39639	pull. ×	5.6.65 7.9.65	Fowley Island: 51°21'N. 0°52'E. (Kent) MKRG Mooncoin (Kilkenny) 350m. WNW.
EC70885	pull. +	13.6.65 4.8.65	Fowley Island MKRG De Blankaart: 50°59'N. 2°52'E. (West Flanders) Belgium
EC70721	pull. ×	13.6.65 28.8.65	Fowley Island MKRG Penmarch: 47°49'N. 4°20'W. (Finistère) France

Table E—Countries and months of recoveries of Black-headed Gulls

Country of recovery	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Spain (1)	1	—	—	—	—	—	—	—	—	—	—	—
Netherlands (3)	—	2	—	—	—	—	—	—	—	—	—	—
Germany (1)	—	—	—	—	1	—	—	—	—	—	—	—
Denmark (18)	—	—	1	1	—	4	4	3	3	—	2	—
Norway (2)	—	—	—	—	1	1	—	—	—	—	—	—
Sweden (6*)	—	—	—	1	—	2	2	—	—	—	—	—
Czechoslovakia (3)	—	—	—	—	1	1	1	—	—	—	—	—
Poland (1)	—	—	—	—	—	1	—	—	—	—	—	—
Baltic States (3)	—	—	—	1	1	1	—	—	—	—	—	—
Finland (6)	—	—	—	1	1	2	1	—	1	—	—	—

*One recovery undated See footnote to table A

Kittiwake (*Rissa tridactyla*) (42; 10 years)

2044036	pull. ()	8.7.60 17.12.65	Dunbar: 56°00'N. 2°31'W. (East Lothian) JCC Petrushvka: 50°54'N. 35°17'W. (Sumsk) U.S.S.R.
EC35310	pull. +	29.6.64 16.1.65	Farne Islands: 55°37'N. 1°37'W. (Northumberland) ND&N Setúbal: 38°31'W. 8°54'W. (Estremadura) Portugal

These are, respectively, the first and second recoveries of British-ringed Kittiwakes from the U.S.S.R. and Portugal. Eleven recoveries from well-represented localities overseas will be tabulated in a future report.

Common Tern (*Sterna hirundo*) (35; 120 miles; 9 $\frac{10}{12}$ years)

Table F—Countries and months of recoveries of Common Terns

Country of recovery	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
France (1)	—	—	—	—	—	—	—	—	1	—	—	—
Portugal (3)	—	—	—	—	—	—	—	1	1	1	—	—
Sénégal (5)	2	—	—	1	—	—	—	—	—	—	1	1
Portuguese Guinea (1)	—	—	1	—	—	—	—	—	—	—	—	—
Sierra Leone (1)	—	—	—	—	—	—	—	—	—	—	—	1
Liberia (1)	—	—	—	—	—	1	—	—	—	—	—	—
Ivory Coast (1)	—	—	—	—	—	—	—	1	—	—	—	—
Ghana (3)	—	—	—	—	—	—	—	1	—	—	1	1
Angola (1)	—	—	—	—	—	—	1	—	—	—	—	—

See footnote to table A

Arctic Tern (*Sterna paradisaea*) (32; 300 miles; 26 $\frac{11}{12}$ years)

Pulli ringed on the Farne Islands, 55°37'N. 1°37'W. (Northumberland), were recovered as follows:

Ringed			Recovered	
V93186	18.7.58	26.6.62	near Minden: c. 52°20'N. 9°00'E. (Nordrhein-Westfalen) Germany	
CK25205	13.7.62	14.5.65	Hollen: 53°27'N. 8°40'E. (Niedersachsen) Germany	
CK24080	13.7.63	23.7.65	Kochevo: 59°36'N. 54°23'E. (Perm) U.S.S.R.	
CK34665	19.6.65	14.7.65	Campbeltown (Argyll) 150m. W.	

recovery localities of V93186 and CK24080 are both inland. In addition to above, Arctic Terns from the Farne Islands were recovered in Portuguese area (February, one) and Angola (September, one; and October, two).

Roseate Tern (*Sterna dougallii*) (14; $5\frac{2}{12}$ years)

477	pull.	5.7.63	(Anglesey)
	x	28.9.65	Budbrooke Barracks (Warwick) 140m. ESE.

recovery may be compared with CK08993 published in the 1964 report (*Birds*, 58: 561). One recovery in France, one in Portugal and ten in West Africa will be tabulated in a future report.

Sandwich Tern (*Sterna sandvicensis*) (78; $7\frac{11}{12}$ years)

Three Sandwich Terns caught in June at a colony near Newburgh, Aberdeen, two had been ringed on the Farne Islands, Northumberland, and one on the coast in the Firth of Forth. A large catch made on 12th June on Green Island, Dungannon Lough, Co. Down, included one each from Ravenglass, Cumberland, Horse Island, Ayrshire, and no fewer than four from the Farne Islands. An even more striking example of the tendency for some of these terns to breed away from their natal colony follows. A total of 47 recoveries in western Europe and Africa will be tabulated in a future report.

13	pull.	25.6.61	Farne Islands: $55^{\circ}37'N$. $1^{\circ}37'W$. (Northumberland) ND&N
	v	29.6.65	Langenwerder: $54^{\circ}02'N$. $11^{\circ}30'E$. (Mecklenburg) Germany

Razorbill (*Alca torda*) (28; 300 miles; $4\frac{10}{12}$ years)

31	ad.	8.7.65	Handa: $58^{\circ}23'N$. $5^{\circ}11'W$. (Sutherland) C&S
	x	12.12.65	Hörnum: $54^{\circ}45'N$. $7^{\circ}57'E$. Sylt, Germany
87	ad.	12.7.64	Handa C&S
	x	15.1.65	Biarritz: $43^{\circ}29'N$. $1^{\circ}33'W$. (Basses-Pyrénées) France
66	pull.	28.6.64	Berneray: $56^{\circ}47'N$. $7^{\circ}38'W$. Outer Hebrides AWD
	()	10.1.65	Golfe du Morbihan: c. $47^{\circ}35'N$. $2^{\circ}50'W$. France
53	pull.	28.6.64	Berneray AWD
	+	14.2.65	Islas Cies: c. $42^{\circ}15'N$. $8^{\circ}55'W$. (Pontevedra) Spain
20	pull.	9.7.65	Rathlin: $55^{\circ}17'N$. $6^{\circ}15'W$. (Antrim) NDM
	x	12.12.65	Notre Dame de Monts: $46^{\circ}50'N$. $2^{\circ}08'W$. (Vendée) France
293	pull.	23.6.64	Muck Island: $54^{\circ}51'N$. $5^{\circ}44'W$. (Antrim) JAB
	+	24.1.65	Hendaye: $43^{\circ}22'N$. $1^{\circ}46'W$. (Basses-Pyrénées) France
113	pull.	28.6.65	Port St. Mary: $54^{\circ}04'N$. $4^{\circ}44'W$. Isle of Man EBr
	x	21.12.65	Bueu: $42^{\circ}19'N$. $8^{\circ}47'W$. (Pontevedra) Spain
114	pull.	9.7.65	Port St. Mary EBr
	x	23.11.65	Mimizan Plage: $44^{\circ}12'N$. $1^{\circ}18'W$. (Landes) France
10	pull.	24.6.63	Puffin Island: $53^{\circ}19'N$. $4^{\circ}01'W$. (Anglesey) WP&M
	x	17.1.65	IJmuiden: $52^{\circ}29'N$. $4^{\circ}35'E$. (Noord-Holland) Netherlands
79	pull.	7.7.63	Bardsey
	+	(9.3.65)	Cabo de la Nao: $38^{\circ}44'N$. $0^{\circ}14'E$. (Alicante) Spain
104	ad.	28.6.62	Skomer: $51^{\circ}44'N$. $5^{\circ}19'W$. (Pembroke) MPH
	x	5.4.65	Vierville: $49^{\circ}23'N$. $0^{\circ}55'W$. (Calvados) France
86	ad.	9.7.61	Annet: $49^{\circ}54'N$. $6^{\circ}22'W$. Isles of Scilly SABO
	x	7.2.65	Katwijk: $52^{\circ}12'N$. $4^{\circ}24'E$. (Zuid-Holland) Netherlands

Guillemot (*Uria aalge*) (23; 6 $\frac{10}{12}$ years)

There were eight recoveries in Norway, two in France and one each in the Netherlands and Spain. These will be tabulated in a future report.

Puffin (*Fratercula arctica*) (16; 150 miles; 6 $\frac{6}{12}$ years)

AT59419	ad.	25.7.58	Fair Isle
	×	24.1.65	Eoligarry, Barra, Outer Hebrides 270m. SW.
AT77342	pull.	15.7.61	Fair Isle
	+	7.3.65	Malpica de Bergantinos: 43°19'N. 8°49'W. (Coruña) Spain
AT51389	pull.	3.7.59	Farne Islands: 55°37'N. 1°37'W. (Northumberland) ND&N
	×	(25.2.65)	Cley (Norfolk) 215m. SE.
EC26775	juv.	15.7.64	Farne Islands ND&N
	+	2.1.65	Randesund: 58°08'N. 8°08'E. (Vest-Agder) Norway
EC35189	pull.	5.8.64	Farne Islands ND&N
	+	17.1.65	off Kristiansand: c. 58°00'N. 7°50'E. (Vest-Agder) Norway
AT84550	ad.	28.6.62	Skomer: 51°44'N. 5°19'W. (Pembroke) MPH
	×	19.4.65	Ste Anne la Palud: 48°08'N. 4°17'W. (Finistère) France
AT84106	pull.	13.7.62	Skomer MPH
	×	(6.12.65)	Lacanau Ocean: 45°00'N. 1°12'W. (Gironde) France
SS11772	ad.	26.7.63	Skokholm
	×	2.11.65	Carrowmore Bay (Clare) 190m. WNW.

Woodpigeon (*Columba palumbus*) (103; 50 miles; 7 $\frac{2}{12}$ years)

SS05878	ad.	29.4.64	Fair Isle
	+	8.9.65	Watten (Caithness) 95m. SW.
3080781	ad.	30.7.63	Weston Colville: 52°10'N. 0°21'E. (Cambridge) MAFF
	+	3.1.65	St. Christol: 44°05'N. 4°04'E. (Gard) France
381420	f.g.	13.4.62	Elm Park: 51°33'N. 0°12'E. Romford (Essex) RRS
	+	11.1.65	Barford (Warwick) 90m. NW.

Few British-ringed Woodpigeons have been recovered abroad and 3080781 much the most south-easterly of them.

Turtle Dove (*Streptopelia turtur*) (18; 3 $\frac{10}{12}$ years)

Table G—Countries and months of recoveries of Turtle Doves

Country of recovery	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
France (8)	-	-	-	-	5	-	-	-	3	-	-	-
Spain (6)	-	-	-	-	-	-	-	-	3	3	-	-
Portugal (3)	-	-	-	-	-	-	-	-	3	-	-	-

See footnote to table A

Collared Dove (*Streptopelia decaocto*) (17; 30 miles; 3 $\frac{2}{12}$ years)

3002513	f.g.	4.7.63	Clacton-on-Sea: 51°48'N. 1°09'E. (Essex) GF
	×	10.7.65	South Benfleet (Essex) 30m. SW.
3002525	f.g.	5.2.64	Clacton-on-Sea GF
	v	c. 20.4.65	Pennar, Pembroke Dock (Pembroke) 260m. W.
3033953	f.g.	22.11.64	Bradwell
	×	5.8.65	near Melun: 48°31'N. 2°39'E. (Seine-Maritime) France
3088580	1st W.	4.10.64	Avonmouth: 51°31'N. 2°42'W. (Gloucester) PJC
	+	20.11.65	Exeter (Devon) 63m. SSW.

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589 ad. 31.1.65 Avonmouth PJC
v (12.11.65) Dawlish (Devon) 70m. SSW.

These are the first recoveries at a distance of British-ringed Collared Doves.

Cuckoo (*Cuculus canorus*) (5; 60 miles; $3\frac{9}{12}$ year)

452 juv. 29.7.64 Gibraltar Point
+ 4.5.65 Mellicha: $35^{\circ}58'N$. $14^{\circ}22'E$. Malta
755 pull. 27.6.65 Newport Pagnell: $52^{\circ}05'N$. $0^{\circ}44'W$. (Buckingham) HMG
x 6.9.65 Vernioz: $45^{\circ}26'N$. $4^{\circ}53'E$. (Isère) France
23 pull. 23.6.65 Mynachlog-Ddu: $51^{\circ}55'N$. $4^{\circ}43'W$. (Pembroke) PJC
+ 14.9.65 Busalla: $44^{\circ}34'N$. $8^{\circ}56'E$. (Liguria) Italy

452 is only the second recovery of a British-ringed bird in Malta, the other being a Short-eared Owl in 1934.

Barn Owl (*Tyto alba*) (23; 50 miles; $3\frac{10}{12}$ years)

565 pull. 26.7.65 Carronbridge: $55^{\circ}16'N$. $3^{\circ}48'W$. (Dumfries) NSRG
x (car) 13.11.65 between Coldstream and Kelso, c. 60m. ENF.
4699 pull. 18.7.64 Leigh: $53^{\circ}30'N$. $2^{\circ}33'W$. (Lancashire) MRG
v 18.8.65 Leeming Bar, Northallerton (York) 65m. NF.

Little Owl (*Athene noctua*) (9; 30 miles; $4\frac{7}{12}$ years)

17 pull. 14.6.64 Chalcombe: $52^{\circ}05'N$. $1^{\circ}16'W$. (Oxford) MGP
x 19.5.65 Milford-on-Sea (Hampshire) 93m. S.

Short-eared Owl (*Asio flammeus*) (4; 10 miles; $4\frac{6}{12}$ years)

16 pull. 17.7.60 Moniaive: $55^{\circ}11'N$. $3^{\circ}55'W$. (Dumfries) TT
+ 21.1.65 Donamon (Roscommon) 200m. WSW.
227 pull. 15.5.65 Redmires: $53^{\circ}22'N$. $1^{\circ}37'W$. Sheffield (York) SNHS
x 3.10.65 Germignonville: $48^{\circ}11'N$. $1^{\circ}44'E$. (Eure-et-Loire) France

Swift (*Apus apus*) (139; 100 miles; $8\frac{10}{12}$ years)

58 ad. 23.7.61 Leicester: $52^{\circ}38'N$. $1^{\circ}05'W$. CTB
+ 3.2.65 Bakwa-Nzeba: $4^{\circ}39'S$. $21^{\circ}34'E$. (Kasai) Congo
64 ad. 12.7.64 Biddenham: $52^{\circ}08'N$. $0^{\circ}30'W$. (Bedford) PJW
x 1.6.65 Aurillac: $44^{\circ}56'N$. $2^{\circ}26'E$. (Cantal) France
33 ad. 29.6.63 Hoddesdon: $51^{\circ}47'N$. $0^{\circ}00'$ (Hertford) RMRG
x 7.6.65 Somerby, Brigg (Lincoln) 125m. N.
37 ad. 30.6.63 Hoddesdon RMRG
() 29.12.65 Palombe: $15^{\circ}49'S$. $35^{\circ}44'E$. Malawi
83 ad. 21.5.65 Barn Elms: $51^{\circ}28'N$. $0^{\circ}14'W$. (Surrey) NKRG
x 23.8.65 Cases de Pène: $42^{\circ}47'N$. $2^{\circ}47'E$. (Pyrénées-Orientales) France
24 f.g. 4.7.62 Beddington: $51^{\circ}23'N$. $0^{\circ}08'W$. (Surrey) LNHS
x (24.5.65) Guernica: $43^{\circ}19'N$. $2^{\circ}40'W$. (Vizcaya) Spain

This further series of interesting recoveries establishes beyond doubt that the Swift is particularly worth-while species to ring.

Skylark (*Alanda arvensis*) (4; 10 miles; $2\frac{1}{12}$ years)

650 f.g. 3.11.64 Eddystone Lighthouse: $50^{\circ}10'N$. $4^{\circ}16'W$. HST
x 29.8.65 Haroldswick, Unst (Shetland) 750m. N.

This remarkable recovery establishes a record for long-distance movement within British Isles.

Swallow (*Hirundo rustica*) (433; 5 years)

AN10688	pull.	16.7.64	Warcop: 54°32'N. 2°24'W. Appleby (Westmorland)	RWR
	×	11.1.65	Walvis Bay: 23°00'S. 14°31'E. South West Africa	
AR88078	juv.	10.7.65	Adwick-le-Street: 53°34'N. 1°11'W. (York)	ARS
	v	28.10.65	Santa Isabel: 3°45'N. 8°48'E. Fernando Po	
N83591	juv.	16.7.64	East Tilbury: 51°28'N. 0°26'E. (Essex)	ABO
	/?/	end 1.65	Gobabis: 22°30'S. 18°58'E. (Damaraland)	South West Africa

These are the first recoveries from South West Africa and Fernando Po. A total of 44 recoveries in western Europe and Africa will be tabulated in a future report. It may be mentioned, however, that a campaign by South African ringers to catch roosting Swallows is leading to the recovery of many British-ringed birds.

House Martin (*Delichon urbica*) (18; 35 miles; 3 $\frac{9}{12}$ years)

AA89386	ad.	15.7.61	Ilkley: 53°56'N. 1°49'W. (York)	WNS
	v	8.5.65	Fort-Mahon: 50°20'N. 1°34'E. (Somme)	France
AS73041	ad.	27.5.65	Sinfin: 52°58'N. 1°30'W. (Derby)	ABW
	v	19.7.65	Bodenham, Leominster (Hereford)	70m. SW.
AS85709	ad.	30.5.65	Chew Valley Reservoir: 51°20'N. 2°38'W. (Somerset)	CVRS
	v	20.9.65	Keston (Kent)	115m. E.

Sand Martin (*Riparia riparia*) (2,119; 5 $\frac{1}{12}$ years)

It is impossible to summarise over 2,000 recoveries adequately in the space available. No less than 84 reports from abroad (nearly all controlled) are listed in table H. A total of 484 recoveries within the British Isles showed movements of over 100 miles. Many Sand Martins are recovered more than once during the course of their lives. Two examples of this are published in full to illustrate how informative such multiple recoveries can be.

Table H—Countries and months of recoveries of Sand Martins

Country of recovery	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Netherlands (2)	—	—	—	—	2	—	—	—	—	—	—	—
Belgium (5)	—	—	—	1	2	—	2	—	—	—	—	—
Channel Is. (1)	—	—	—	—	1	—	—	—	—	—	—	—
France (62)	—	—	—	7	3	—	—	9	43	—	—	—
Spain (9)	—	—	1	1	1	—	—	—	4	2	—	—
Morocco (5)	—	—	—	4	1	—	—	—	—	—	—	—

See footnote to table A

N87262	ad.	2.8.64	Casbrook Common: 51°01'N. 1°30'W. (Hampshire)	M&B
	v	4.4.65	Defila: 32°10'N. 1°15'W. Figuig, Morocco	
	v	8.8.65	Casbrook Common	
N71052	ad.	15.8.63	Chichester: 50°49'N. 0°46'W. (Sussex)	CRG
	v	19.7.64	Kincaig (Inverness) 450m. NNW.	
	v	14.8.64	Chichester	
	×	(car) 20.6.65	near Newtonmore (Inverness) (7m. SW. of Kincaig)	

Rook (*Corvus frugilegus*) (55; 40 miles; 9 years)

3099737	pull.	22.4.65	near Ellon: 57°22'N. 2°05'W. (Aberdeen)	AU
	+	4.11.65	Blackruthven, Crieff (Perth) 95m. SW.	

Magpie (*Pica pica*) (19; 10 miles; 9 $\frac{1}{12}$ years)

3079858	pull.	8.5.62	Winchester: 51°04'N. 1°19'W.	WC
	v	(19.9.65)	Monxton, Andover (Hampshire) 13m. NW.	

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Great Tit (*Parus major*) (176; 30 miles; 8 $\frac{10}{12}$ years)

1532	1stW. ♂	21.2.65	Cambridge: 52°12'N. 0°07'E. SKT
	x	5.4.65	Hitcham, Hadleigh (Suffolk) 33m. E.
588	f.g. ♂	14.2.65	Colchester: 51°53'N. 0°53'E. (Essex) AJW
	v	12.5.65	Plex Moss, Formby (Lancashire) 200m. WNW.
944	1stW. ♀	20.10.64	Ashridge: 51°48'N. 0°34'W. Berkhamsted (Hertford) JNTW
	x	6.4.65	Colchester (Essex) 60m. E.

Blue Tit (*Parus caeruleus*) (338; 30 miles; 7 $\frac{2}{12}$ years)

4852	ad.	21.12.63	Stibbington: 52°34'N. 0°24'W. (Huntingdon) C&F
	x	(22.4.65)	Edwinstowe (Nottingham) 53m. NW.
934	1stW.	2.2.64	Cambridge: 52°12'N. 0°07'E. AWD
	x c.	15.2.65	Little Baddow, Chelmsford (Essex) 36m. SSE.
13	pull.	0.6.64	Wytham: 51°47'N. 1°19'W. (Berkshire) EGI
	v	24.1.65	Nuneaton (Warwick) 50m. N.
152	1stW.	17.10.64	Skokholm
	x	31.1.65	Bynea, Llanelly (Carmarthen) 50m. E.
336	juv.	24.7.65	Chew Valley Reservoir: 51°20'N. 2°38'W. (Somerset) CVRS
	v	28.12.65	Sidmouth (Devon) 55m. SW.
136	pull.	17.5.61	East Malling: 51°18'N. 0°26'E. (Kent) MKRG
	v	7.2.65	Iffley (Oxford) 75m. WNW.
046	ad.	29.2.64	Winterbourne: 51°07'N. 1°44'W. (Wiltshire) F&H
	x	17.3.65	Reading (Berkshire) 40m. NE.
195	1stW.	4.10.64	Eastbourne: 50°46'N. 0°17'E. (Sussex) DDH
	v	20.11.65	Dover (Kent) 50m. ENE.

Long-tailed Tit (*Aegithalos caudatus*) (10; 5 miles; 3 $\frac{4}{12}$ years)

455	f.g.	3.9.64	Ailsworth: 52°35'N. 0°19'W. (Northampton) C&F
	x	(13.4.65)	Arnold (Nottingham) 43m. NW.
442	f.g.	3.1.65	Stock: 51°41'N. 0°26'E. Ingatestone (Essex) AGH
	x	22.1.65	Woodford Green (Essex) 19m. W.
12	ad.	12.8.61	Stanwell: 51°27'N. 0°29'W. (Middlesex) FKB
	x A	(11.1.65)	near Gosport (Hampshire) 52m. SW.

Bearded Tit (*Panurus biarmicus*) (36; 25 miles; 1 $\frac{11}{12}$ years)

Bearded Tit population in East Anglia and the Low Countries exploded in the summer and autumn of 1965 and parties ranged widely through England and Wales, even reaching Ireland. Such parties tended to keep together: thus four were ringed at Anderby Creek, near Sutton-on-Sea, Lincolnshire, on 10th October, all controlled on 14th October at Tetney Lock, 20 miles to the north-west. Recoveries of 35 miles have been omitted to protect a new breeding site. Bearded Tits in Britain will be listed by Robert Hudson in the next survey of recoveries of birds ringed abroad, and the eruptions of this species are the subject of an analysis by H. E. Axell in the December issue.

12	ad. ♂	10.10.65	Bamburgh: 55°36'N. 1°42'W. (Northumberland) BRS
	v	26.12.65	Low Hauxley, Amble (Northumberland) 20m. S.
6	f.g. ♂	1.11.64	Northfleet: 51°27'N. 0°20'E. (Kent) B&I
	v	26.9.65	Walberswick (Suffolk) 80m. NE.
2	ad. ♀	25.10.64	The Crumbles: 50°47'N. 0°19'E. Eastbourne (Sussex) RHC
	v	13.5.65	(Kent)

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AS83766	f.g. ♀	17.10.65	Portland Bill
	v	24.10.65	Chew Valley Reservoir (Somerset) 57m. N.
AS83767	f.g. ♂	17.10.65	Portland Bill
	v	13.11.65	Chew Valley Reservoir

Bearded Tits ringed at Walberswick, 52°18'N. 1°37'E., Suffolk, were recovered as follows:

Ringed		Recovered	
AH46680*	6.7.64	3.11.65	Springhead, Northfleet (Kent) 80m. SW.
HB22849	9.9.65	3.11.65	Wick Hams, Christchurch (Hampshire) 180m. SW.
HB22894	9.9.65	23.10.65	Rye Meads, Hoddesdon (Hertford) 77m. SW.
HB64025	15.9.65	23.10.65	Stanpit, Christchurch (Hampshire) 180m. SW.
		3.11.65	Stanpit
HB64120	17.9.65	23.10.65	Rye Meads
HB64283	26.9.65	30.10.65	Northfleet (Kent) 80m. SW.

*Ringed as juvenile; the remainder were ringed as full-grown

Wren (*Troglodytes troglodytes*) (17; 10 miles; 1 $\frac{7}{12}$ years)

HB77694	f.g.	31.10.65	Bamburgh: 55°36'N. 1°42'W. (Northumberland) BRS
	×	c. 23.11.65	Stannington, Morpeth (Northumberland) 33m. S.

Dipper (*Cinclus cinclus*) (10; 10 miles; 1 $\frac{1}{12}$ years)

2070036	1stS. ♂	18.5.64	Rowley Burn: 54°55'N. 2°08'W. Hexham (Northumberland) ND&N
	×	18.1.65	Cockfield Fell, Barnard Castle (Durham) 24m. SE.
CX14909	pull.	12.5.64	Dunsop Bridge: 53°57'N. 2°31'W. Slaidburn (York) W&M
	v	23.5.65	Askwith, Otley (York) 33m. E.

Previously, the longest Dipper movement recorded by ringing was twelve miles. Most recoveries are within two or three miles of the ringing locality.

Mistle Thrush (*Turdus viscivorus*) (29; 15 miles; 6 $\frac{7}{12}$ years)

CX87313	f.g.	23.11.65	Stockbury: 51°20'N. 0°41'E. (Kent) MKRG
	+	28.11.65	Amblainville: 49°12'N. 2°07'E. (Oise) France

Fieldfare (*Turdus pilaris*) (10; 40 miles; 3 $\frac{2}{12}$ years)

65456R	1stW. ♀	25.12.62	Carnforth: 54°08'N. 2°46'W. (Lancashire) WP&M
	×	0.9.64	Härnösand: 62°37'N. 17°55'E. (Väster-Norrland) Sweden
CB54860	f.g.	27.12.64	Mablethorpe: 53°21'N. 0°15'E. (Lincoln) CRM
	+	21.11.65	Imola: 44°21'N. 11°44'E. (Bologna) Italy
59098R	1stW. ♀	22.10.62	Bracewater: 52°58'N. 0°38'E. (Norfolk) WAC
	+	26.12.65	Givry: 46°47'N. 4°45'E. (Saône-et-Loire) France
02389X	f.g.	22.11.64	Brome: 52°21'N. 1°08'E. Eye (Suffolk) GRB
	×	(17.11.65)	Verdalsora: 63°50'N. 11°30'E. (Nord-Trøndelag) Norway
CX04659	f.g.	24.2.63	Cliffe: 51°28'N. 0°30'E. (Kent) NKRK
	+	17.10.65	Snertingdal: 60°53'N. 10°20'E. (Oppland) Norway
CX56494	1stW.	23.1.65	Chattenden: 51°26'N. 0°31'E. (Kent) NKRK
	×	3.5.65	Oslo: 59°55'N. 10°45'E. (Akershus) Norway

Song Thrush (*Turdus philomelos*) (316; 8 years)

Recoveries published in full are confined to birds ringed in the months April, August and travelling more than 100 miles. Nineteen foreign recoveries of birds ringed outside this period (mainly in October and November) are summarised in table I.

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18	f.g.	10.6.63	Gosforth: 55°01'N. 1°36'W. (Northumberland)	PB&W
	×	2.3.65	Llwyngwrl (Merioneth) 190m. SW.	
546	juv.	4.8.63	Gouthwaite: 54°05'N. 1°45'W. (York)	SS&W
	×	4.1.65	Loughbrickland, Banbridge (Down) 180m. W.	
·X	ad.	9.7.60	Calf of Man	
	×	13.1.65	Fermoy (Cork) 195m. SW.	
598	pull.	26.5.64	New Waltham: 53°35'N. 0°05'W. (Lincoln)	SL
	+	4.2.65	Montejicar: 37°34'N. 3°29'W. (Granada)	Spain
259	pull.	23.5.64	Stoke-by-Nayland: 51°59'N. 0°54'E. (Suffolk)	AJW
	+	5.1.65	Mouguerre: 43°28'N. 1°24'W. (Basses-Pyrénées)	France
749	f.g.	16.8.64	Cheddington: 51°52'N. 0°40'W. (Buckingham)	PED
	+	c. 2.2.65	El Ferrol del Caudillo: 43°29'N. 8°14'W. (Coruña)	Spain
702	juv.	16.7.65	West Wycombe: 51°39'N. 0°48'W. (Buckingham)	SBRG
	+	8.12.65	near Harfleur: 49°30'N. 0°14'E. (Seine-Maritime)	France
340	f.g.	30.8.65	Havering: 51°37'N. 0°11'E. Romford (Essex)	PWDW
	+	1.11.65	near Coimbra: 40°12'N. 8°25'W. (Beira Litoral)	Portugal

Table I—Countries and months of recoveries of Song Thrushes

of recovery	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1 (1)	—	—	—	—	—	—	1	—	—	—	—	—
(9)	2	2	—	1	—	—	—	—	—	—	2	2
(*)	—	1	—	—	1	—	—	—	—	—	1	—
1 (5)	3	—	1	—	—	—	—	—	—	—	1	—

*Total includes one undated record
See footnote to table A

Redwing (*Turdus iliacus*) (37; 2 $\frac{5}{12}$ years)

888	f.g.	20.12.64	Sandon: 52°53'N. 2°05'W. (Stafford)	C&PM
	×	2.5.65	Lyskovo: 56°03'N. 45°04'E. (Gorkiy)	U.S.S.R.
X	f.g.	22.12.62	Wytham: 51°47'N. 1°19'W. (Berkshire)	EGI
	+	(1965)	Natanebi: 41°57'N. 41°48'E. (Georgia)	U.S.S.R.
92	f.g.	29.12.64	Cliffe: 51°28'N. 0°30'E. (Kent)	B&I
	×	10.6.65	Novyye Lyady: 58°03'N. 56°37'E. (Perm)	U.S.S.R.

re recoveries are all well to the east. A further 18 foreign recoveries are summed in table J.

Table J—Countries and months of recoveries of Redwings

of recovery	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(1)	—	—	—	—	—	—	—	—	—	1	—	—
(5)	1	2	—	—	—	—	1	—	—	—	—	2
	1	—	1	—	—	—	—	—	—	—	—	—
(5)	2	1	—	—	—	—	—	—	—	—	2	—
	—	1	—	—	—	—	—	—	—	—	—	1
(1)	—	—	—	—	—	—	—	—	1	—	—	—
(1)	—	—	—	1	—	—	—	—	—	—	—	—

See footnote to table A

Ring Ouzel (*Turdus torquatus*) (7; 6 $\frac{5}{12}$ years)

11	ad. +	3.10.65	Isle of May	
	+	7.11.65	Argelès-Gazost: 43°01'N. 0°06'E. (Hautes-Pyrénées)	France
13	f.g.	2.10.65	Graythorp: 54°41'N. 1°13'W. (Durham)	PR
	+	24.10.65	Parentis-en-Born: 44°21'N. 1°04'W. (Landes)	France



RING OUZEL



SPOTTED FLYCATCHER



PIED FLYCATCHER

MAPS 3, 4 and 5. All foreign recoveries of Ring Ouzel *Turdus torquatus*, Spotted Flycatcher *Muscicapa striata* and Pied Flycatcher *Ficedula hypoleuca* Recoveries mentioned in this report are marked by open circles and previous ones by solid circles (drawn by R. C. Faulkner)

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53	pull. +	18.5.59 22.10.65	Lofthouse: 54°10'N. 1°50'W. (Yorkshire) SS&W Mirepoix: 43°49'N. 1°35'E. (Haute-Garonne) France
193	pull. +	8.6.65 (28.9.65)	Lofthouse SS&W Marvejols: 44°33'N. 3°18'E. (Lozère) France
R	1stW. ♀ ×	3.10.63 0.12.65	Calf of Man Azilal: 32°00'N. 6°35'W. (Beni-Mellal) Morocco
1743	1stW. ♀ +	7.9.64 2.10.64	Calf of Man Lavigerie: 45°08'N. 2°46'E. (Cantal) France
1695	f.g. ♀ +	4.10.65 30.10.65	Spurn Point Torcy-le-Grand: 49°48'N. 1°10'E. (Seine-Maritime) France

is the best series of Ring Ouzel recoveries reported in one year. It will be noted that three of them were ringed at the time of a good east coast arrival in October. Map 3 shows that the trend in the migration of this species is northerly rather than south-westerly.

Blackbird (*Turdus merula*) (1,597; 8 $\frac{11}{12}$ years)

See K summarises all recoveries reported in 1964 and 1965, other than those published in full in the 1964 report or below. Recoveries in north-east Europe and Asia are now reported annually, often in numbers, and this is the last year in which such records will automatically qualify for publication in full. CX59384 is, however, the first British-ringed Blackbird to be recovered in Portugal.

233	1stW. ♀ +	26.3.65 12.12.65	Fair Isle Gijón: 43°32'N. 5°40'W. (Oviedo) Spain
R	1stW. ♂ +	10.3.63 13.8.65	Nunthorpe: 54°31'N. 1°10'W. (York) TAB Hyytsaari: 62°21'N. 29°37'E. (Pohjois-Karjala) Finland
R	1stW. ♂ ×	18.1.63 0.12.64	Sleights: 54°27'N. 0°40'W. (York) MHN Skatavägen: 62°15'N. 21°20'E. (Vaasa) Finland
16	1stW. ♂ +	20.12.63 5.10.64	Knaresborough: 54°01'N. 1°28'W. (York) KRS Vestervik: 59°57'N. 23°30'E. (Uusimaa) Finland
R	ad. ♂ +	10.1.63 26.12.65	Wetherby: 53°56'N. 1°23'W. (York) KRS Algorta: 43°20'N. 3°00'W. (Vizcaya) Spain
15	1stW. ♀ +	2.10.65 15.11.65	Spurn Point Ribadeo: 43°32'N. 7°04'W. (Lugo) Spain
82	1stW. ♂ +	1.1.65 10.10.65	Cleethorpes: 53°34'N. 0°02'W. (Lincoln) KR Koliseva: 60°47'N. 26°21'E. (Kymi) Finland
2	ad. ♂ v ()	16.1.60 31.10.60 0.10.64	Sheffield: 53°23'N. 1°29'W. (York) MCWE Heligoland: 54°11'N. 7°55'E. (Germany) Bu: 58°18'N. 6°20'E. (Rogaland) Norway
95	1stW. ♂ ×	22.3.64 0.7.65	Mere: 53°19'N. 2°24'W. Knutsford (Cheshire) S&B Karjalohja: 60°15'N. 23°44'E. (Uusimaa) Finland
6	ad. ♀ /?/	3.10.65 24.11.65	Huttoft Bank: 53°17'N. 0°17'E. Sutton (Lincoln) JFC Orío: 43°16'N. 2°07'W. (Guipúzcoa) Spain
82	1stW. ♀ +	5.1.64 0.11.64	Holbeach: 52°49'N. 0°01'E. (Lincoln) RKS Llanera: 43°25'N. 5°50'W. (Oviedo) Spain
84	1stW. ♀ +	23.10.65 10.12.65	Bardsey Águeda: 40°34'N. 8°27'W. (Beira Litoral) Portugal
14	ad. ♂ ×	11.1.64 11.4.65	Kesgrave: 52°05'N. 1°13'E. Ipswich (Suffolk) C&S Märjamaa: 58°54'N. 24°26'E. (Rapla) Estonia

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83780R ad. ♂ 2.1.63 Barcombe: 50°54'N. 0°01'E. (Sussex) RRL
 [/?] c. 31.1.65 Kilingi-Nõmme: 58°08'N. 24°59'E. (Pärnu) Estonia

Table K—Countries and months of recoveries of Blackbirds

Country of recovery	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	D
Great Britain												
Local (2,379*)	139	192	296	299	361	338	236	132	86	79	98	111
3-100m. (172*)	15	22	22	15	24	10	13	8	7	10	13	12
100+ m. (37)	4	3	6	7	5	3	—	1	1	1	5	1
Ireland (25)	4	7	2	1	—	—	—	—	—	1	6	4
France (20)	3	3	1	—	—	—	—	—	—	1	4	8
Belgium (6*)	—	—	2	1	—	—	1	—	—	1	—	—
Netherlands (13)	—	—	4	4 ⁸	1	—	1	—	1	1	—	1
Germany (27)	—	—	5	8	1	6	5	—	1	—	1	—
Denmark (22)	4	1	4	3	—	1	3	1	1	—	2	2
Norway (69*)	5	—	11	13	5	1	5	1	1	17	8	1
Sweden (49*)	1	1	3	11	6	5	10	6	3	1	1	—

*Total includes undated records

See footnote to table A

Wheatear (*Oenanthe oenanthe*) (5; 100 miles; 1 $\frac{5}{12}$ years)

BC14079	juv.	2.8.65	Fair Isle
	v	4.9.65	Heligoland: 54°11'N. 7°55'E. Germany
	×	7.10.65	Heligoland
AN28415	ad. ♀	14.5.64	Copeland
	×	c. 20.10.65	Faro: 37°01'N. 7°56'W. (Algarve) Portugal
SE08651	pull.	7.6.65	Appletreewick: 54°03'N. 1°55'W. Skipton (York) WNS
	()	7.9.65	Jerez de la Frontera: 36°41'N. 6°07'W. (Cádiz) Spain
AR37293	1st W.	16.8.65	Gilkicker Point: 50°48'N. 1°08'W. (Hampshire) AKS
	()	20.9.65	Oued-Zem: 32°55'N. 6°33'W. Morocco

Stonechat (*Saxicola torquata*) (2; 5 miles; 1 $\frac{3}{12}$ years)

AS69052	pull.	25.4.65	Frensham: 51°10'N. 0°48'W. (Surrey) PGD
	×	15.12.65	Cuevas de Vinromá: 40°18'N. 0°07'E. (Castellón) Spain

Whinchat (*Saxicola rubetra*) (7; 5 miles; 3 $\frac{1}{12}$ years)

AE84489	1st W. ♀	24.8.63	Spurn Point
	+	13.10.65	Vila Nogueira: 38°31'N. 9°01'W. (Estremadura) Portugal
AS48948	1st W. ♀	28.9.65	Bardsey
	×	(23.12.65)	Puerto Real: 36°32'N. 6°11'W. (Cádiz) Spain
P43151	juv.	14.8.64	Llangorse: 51°57'N. 3°16'W. (Brecon) JLSC
	+	26.10.65	Alvor: 37°08'N. 8°35'W. (Algarve) Portugal
11A96736	ad. ♂	7.9.65	Mentmore: 51°53'N. 0°41'W. (Buckingham) PED
	+	16.10.65	Alfaro: 42°11'N. 1°45'W. (Logroño) Spain

Redstart (*Phoenicurus phoenicurus*) (19; 25 miles; 3 $\frac{8}{12}$ years)

HA09484	juv.	2.10.65	Whitley Bay: 55°03'N. 1°26'W. (Northumberland) TTRG
	+	24.10.65	Djidielli: 36°50'N. 5°43'E. (Constantine) Algeria
AS57763	pull.	4.7.65	Hamsterley: 54°41'N. 1°49'W. (Durham) ND&N
	×	(14.10.65)	Paderne: 37°10'N. 8°12'W. (Algarve) Portugal
AK76286	1st W. ♂	22.8.63	Hilbre: 53°23'N. 3°14'W. (Cheshire) HBO
	+	c. 18.9.65	Sarnadas: 39°44'N. 7°38'W. (Beira Baixa) Portugal
AN34006	pull.	6.6.64	Fernilee: 53°18'N. 1°59'W. (Derby) S&B
	+	17.10.65	Lagoa: 37°07'N. 8°27'W. (Algarve) Portugal



PLATE 70. Male Great Bustard *Otis tarda* in display, Germany. This remarkable photograph, taken in West Berlin Zoo where the species reared young for the first time in captivity in 1964, shows the sudden transformation as the bustard twists over his wing-coverts and tail-feathers in billows of white. Note the distended gular pouch down the front of the neck and the head sunk into the shoulders with the bristly moustachial feathers erected (pages 491-493) (photo: Wolfgang Gewalt)



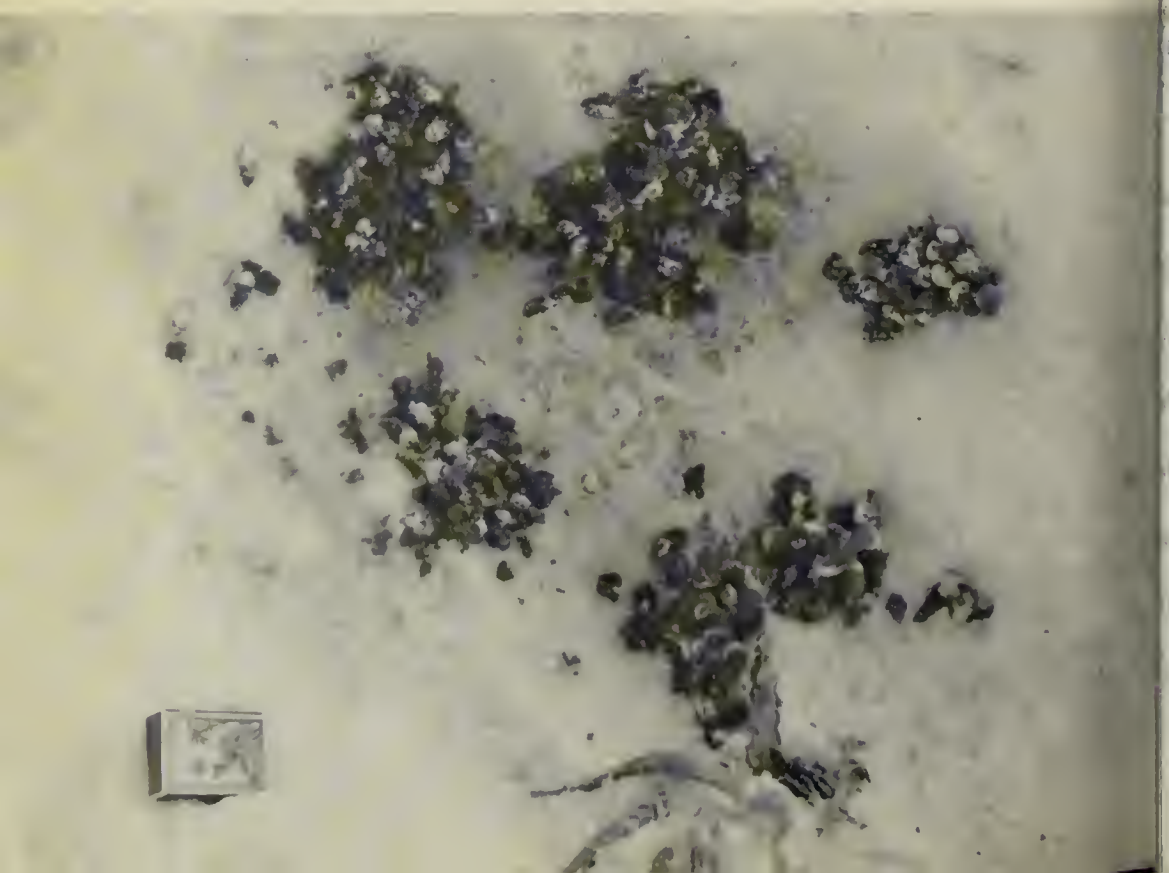


PLATES 71 and 72. Opposite, two more views of displaying male Great Bustard *Otis tarda*, Germany, the upper showing the gular distension without the mass of white (photos: Wolfgang Gewalt). Above, males in flight, Austria; below, close-up of flying female, which has less white in the open wing (photos: Franz Matula)





PLATE 73. Above, male and female Great Bustards *Otis tarda* feeding in snow, Austria, with Rook *Corvus frugilegus* giving size comparison. Below, the distinctively large droppings, photographed here beside a match-box in snow a foot deep, show where the bustard flock has been eating and resting (photos: Franz Matula)



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94889	f.g. ×	4.9.65 25.10.65	Lowestoft: 52°29'N. 1°45'E. (Suffolk) RWC Cachopo: 37°20'N. 7°49'W. (Algarve) Portugal
1949	f.g. +	5.9.65 20.9.65	Benacre: 52°21'N. 1°43'E. (Suffolk) AGH Logroño: 42°28'N. 2°26'W. Spain
4041	1st W. ♂ ()	15.9.65 c. 10.11.65	Walberswick: 52°18'N. 1°37'E. (Suffolk) DBC Córdoba: 37°53'N. 4°46'W. Spain
29205	1st W. ♂ ×	6.9.65 (1.10.65)	Minsmere: 52°14'N. 1°37'E. (Suffolk) HEA Tarazona de Aragon: 41°54'N. 1°44'W. (Zaragoza) Spain
374	f.g. ♀ +	14.6.64 1.10.65	Parkend: 51°46'N. 2°33'W. (Gloucester) BC Sanlúcar: 36°46'N. 6°21'W. (Cádiz) Spain
710	f.g. ♀ ×	23.5.64 0.6.65	Skokholm Advic, Granton-on-Spey (Moray) 400m. N.
0220	f.g. +	30.4.65 0.9.65	Skokholm Rota: 36°37'N. 6°21'W. (Cádiz) Spain
57	ad. ♂ ×	23.8.61 6.5.65	Ruislip: 51°35'N. 0°25'W. (Middlesex) D&P Yarridge, Hexham (Northumberland) 225m. NNW.
8414	juv. +	27.9.65 1.11.65	Ewhurst: 51°09'N. 0°26'W. (Surrey) L&JW Alcácer: 38°22'N. 8°30'W. (Baixo Alentejo) Portugal
5844	1st S. ♂ /?	4.5.65 3.11.65	Dungeness Penamacor: 40°10'N. 7°10'W. (Beira Baixa) Portugal
9452	1st W. ♀ ×	29.8.63 20.9.65	Beachy Head: 50°44'N. 0°16'E. (Sussex) BHRS Paderne: 37°10'N. 8°11'W. (Algarve) Portugal
2941	1st W. ♂ +	28.8.65 19.9.65	Beachy Head BHRS Miranda: 42°41'N. 2°57'W. (Burgos) Spain
554	1st W. ♀ ()	9.9.64 18.10.65	Slapton: 50°17'N. 3°39'W. (Devon) SBO Cantanhede: 40°20'N. 8°36'W. (Beira Litoral) Portugal

first recovery listed is of special interest, both for the speed of the journey because it is the first British-ringed Redstart to be reported from Algeria. 94889, HA51949 and HA29205 were all caught at the time of a vast arrival of and other species on the east coast in early September 1965 (see P. Davis, *Birds*, 59: 353-376).

Robin (*Erithacus rubecula*) (231; 100 miles; 5 years)

59	ad. v	5.5.65 18.5.65	Fair Isle Falsterbo: 55°23'N. 12°50'E. (Malmöhus) Sweden
62	f.g. v	12.3.64 15.2.65	Fair Isle Hesselager: 55°10'N. 10°45'E. (Fyn) Denmark
167	juv. ×	13.5.65 (10.9.65)	Muchalls: 57°01'N. 2°09'W. (Kincardine) AAD Wildsworth, Gainsborough (Lincoln) 250m. S.
836	f.g. ×	29.4.65 13.9.65	Isle of May Skjeberg: 59°14'N. 11°12'E. (Ostfold) Norway
877	f.g. ×	29.4.65 20.10.65	Isle of May Nouzilly: 47°33'N. 0°44'E. (Indre-et-Loire) France
444	f.g. ×	2.10.65 (18.11.65)	Craster: 55°28'N. 1°35'W. (Northumberland) PRE Zandhoven: 51°13'N. 4°40'E. (Antwerpen) Belgium
5	f.g. ×	12.9.64 14.3.65	Calf of Man Rathfarnham (Dublin) 75m. SW.
194	1st W. v	9.10.64 6.2.65	Gibraltar Point Hazebrouck: 50°43'N. 2°32'E. (Nord) France

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AS37743	ad.	29.4.65	Holme: 52°58'N. 0°33'E. (Norfolk) HoBO
	v	5.5.65	Scharhörn: 53°57'N. 8°26'E. Heligoland Bight, Germany
AS37771	f.g.	12.5.65	Holme HoBO
	+	c. 10.10.65	Távora: 41°06'N. 7°32'W. (Tras os Montes) Portugal
AS24819	1stW.	21.9.64	Bardsey
	+	29.1.65	Cilleros: 40°07'N. 6°46'W. (Cáceres) Spain
HB64404	f.g.	3.10.65	Walberswick: 52°18'N. 1°37'E. (Suffolk) DBC
	+	23.10.65	Baños de la Encina: 38°10'N. 3°46'W. (Jaén) Spain
AR96932	1stW.	3.10.64	Sandwich Bay
	v	c. 10.1.65	Bernaville: 50°08'N. 2°10'E. (Somme) France
J67611	ad.	21.9.59	Dungeness
	/2/	1961	Elvas: 38°52'N. 7°10'W. (Alto Alentejo) Portugal

The large arrivals of Continental Robins which occurred on the east coast in late April and early May 1965 are clearly reflected in these recoveries.

Reed Warbler (*Acrocephalus scirpaceus*) (44; 100 miles; 5 $\frac{1}{12}$ years)

AN40614	ad.	1.8.64	Fishtoft: 52°58'N. 0°01'E. Boston (Lincoln) JRM
	v	28.8.64	Chichester (Sussex) 152m. SSW.
	v	27.5.65	Fishtoft
AE09729	ad.	3.6.62	Wilford: 52°56'N. 1°09'W. (Nottingham) ARJ
	+	3.10.65	Portimão: 37°08'N. 8°32'W. (Algarve) Portugal
AE09788	ad.	16.6.62	Harby: 52°53'N. 1°27'W. (Leicester) ARJ
	x	(2.10.65)	West Tilbury (Essex) 110m. SE.
AR63462	juv.	22.8.65	Wiggenhall: 52°41'N. 0°23'E. (Norfolk) AWD
	()	1.9.65	Craon: 47°51'N. 0°57'W. (Mayenne) France
AS59531	pull.	30.6.65	Stanford Reservoir: 52°25'N. 1°07'W. (Leicester) JW
	+	14.11.65	Portimão: 37°08'N. 8°32'W. (Algarve) Portugal
AH46794	ad.	3.9.63	Walberswick: 52°18'N. 1°41'E. (Suffolk) DBC
	v	9.9.65	Canecas: 38°49'N. 9°14'W. (Estremadura) Portugal
AS39728	1stW.	9.8.65	Minsmere: 52°14'N. 1°37'E. (Suffolk) HEA
	x	19.9.65	Carcavelos: 38°41'N. 9°20'W. (Estremadura) Portugal
HA68183	ad.	1.8.65	Weston Turville: 51°47'N. 0°46'W. (Buckingham) SBRG
	+	c. 2.9.65	Quintanilha: 41°45'N. 6°35'W. (Tras os Montes) Portugal
SC70362	pull.	26.7.64	Dorchester: 51°39'N. 1°10'W. (Oxford) OOS
	+	c. 20.10.65	Caldas da Rainha: 39°24'N. 9°08'W. (Estremadura) Portugal
SE21287	pull.	24.6.65	South Horncchurch: 51°33'N. 0°12'E. (Essex) CEJC
	x	8.9.65	Vale de Ilhavo: 40°36'N. 8°40'W. (Beira Litoral) Portugal
N49064	ad.	13.7.63	Cliffe: 51°28'N. 0°30'E. (Kent) NKRK
	x	(3.10.65)	Sidi Ifni: 29°24'N. 10°12'W. Spanish West Africa
AN17694	ad.	28.6.64	Chew Valley Reservoir: 51°20'N. 2°38'W. (Somerset) CVRS
	()	(14.9.65)	Oliveira do Bairro: 40°31'N. 8°30'W. (Beira Litoral) Portugal
HB11357	ad.	14.9.65	Sandwich Bay
	x	30.9.65	Colombes: 48°55'N. 2°14'E. (Seine) France
P36166	pull.	22.7.64	Frensham: 51°10'N. 0°48'W. (Surrey) PGD
	v	18.7.65	Bromswell, Woodbridge (Suffolk) 110m. NE.
AS69659	pull.	21.7.65	Frensham PGD
	+	1.10.65	Tarazona: 41°54'N. 1°44'W. (Zaragoza) Spain
HB50309	1stW.	21.9.65	Beachy Head: 50°44'N. 0°16'E. (Sussex) BHRS
	x	c. 30.11.65	St. Brévin: 47°16'N. 2°09'W. (Loire-Atlantique) France

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627	f.g. +	20.7.63 5.9.65	Sidlesham: 50°47'N. 0°48'W. (Sussex) L&JW Bustos: 40°30'N. 8°36'W. (Beira Litoral) Portugal
0931	juv. +	1.8.65 15.9.65	Slapton: 50°17'N. 3°39'W. (Devon) SIBO Sidi Ifni, Spanish West Africa
86323	1st W. /?/	4.9.65 27.10.65	Slapton SIBO Paderne: 37°10'N. 8°12'W. (Algarve) Portugal

recoveries in Ifni are the most southerly ones so far recorded for this species.

Sedge Warbler (*Acrocephalus schoenobaenus*) (30; 100 miles; 6 years)

9365	ad. ×	1.8.65 24.8.65	Tetney Lock: 53°29'N. 0°01'W. (Lincoln) CIRG Ile d'Olonne: 46°33'N. 1°46'W. (Vendée) France
1053	juv. v	14.8.65 16.8.65	Bedworth: 52°29'N. 1°28'W. (Warwick) MJD Sandwich Bay (Kent) 140m. SE.
1771	juv. ×	1.7.65 (18.8.65)	Abberton Anglet: 43°29'N. 1°30'W. (Basses-Pyrénées) France
443	juv. v	28.8.65 12.9.65	Hoddesdon: 51°47'N. 0°00' (Hertford) RMRG Chew Valley Reservoir (Somerset) 115m. WSW.
8103	juv. ×	25.7.65 c. 10.8.65	Weston Turville: 51°47'N. 0°46'W. (Buckingham) SBRG Bords: 45°54'N. 0°48'W. (Charente-Maritime) France
2430	pull. v	30.6.65 8.8.65	Dorchester: 51°39'N. 1°10'W. (Oxford) OOS Sandwich Bay (Kent) 110m. ESE.
8048	juv. ×	2.8.64 c. 27.5.65	Chew Valley Reservoir: 51°20'N. 2°38'W. (Somerset) CVRS Hollybush (Ayr) 300m. N.
7356	juv. ×	24.7.65 9.8.65	Chew Valley Reservoir CVRS Brest: 48°23'N. 4°30'W. (Finistère) France
41	juv. ×	28.8.64 (10.6.65)	Chichester: 50°50'N. 0°48'W. (Sussex) CRG Stamullen (Meath) 300m. NW.
548	juv. ×	16.9.65 6.10.65	Chichester CRG Villenave: 44°47'N. 0°32'W. (Gironde) France
130	juv. ×	29.8.65 14.9.65	Chichester CRG Bordeaux: 44°49'N. 0°33'W. (Gironde) France
8326	juv. ×	30.7.63 (17.11.65)	Stanpit: 50°44'N. 1°44'W. (Hampshire) CHRS Albufeira: 37°05'N. 8°15'W. (Algarve) Portugal
2191	juv. ×	21.8.64 (22.5.65)	Slapton: 50°17'N. 3°39'W. (Devon) SIBO Trim (Meath) 260m. NW.
2263	ad. ×	22.8.64 c. 10.7.65	Slapton SIBO Aston, Runcorn (Cheshire) 215m. N.

tral of these recoveries provide evidence of an early and speedy autumn
rture from Britain. The one in Portugal is unique.

Blackcap (*Sylvia atricapilla*) (14; 100 miles; 3½ years)

834	ad. ×	8.8.63 22.9.65	Gosforth: 55°02'N. 1°37'W. (Northumberland) PB&W Miranda: 42°41'N. 2°57'W. (Burgos) Spain
677	f.g. +	14.10.64 9.1.65	Spurn Point Maceda: 40°56'N. 8°38'W. (Douro Litoral) Portugal
275	juv. ×	4.8.63 23.1.65	Havering: 51°37'N. 0°11'E. Romford (Essex) JEF Tazzarine: c. 30°50'N. 5°40'W. Morocco
478	ad. ♀ /?/	13.7.65 22.9.65	Reading: 51°27'N. 0°58'W. (Berkshire) LPS Arbizu: 42°55'N. 2°00'W. (Navarra) Spain

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<i>E19153</i>	f.g. ♀ +	9.5.57 (1965)	Dungeness Puerto de Santa Maria: 36°36'N. 6°14'W. (Cádiz) Spain
<i>AC20635</i>	f.g. ♀ ×	20.9.61 18.5.65	Eastbourne: 50°46'N. 0°17'E. (Sussex) DDH Wymondham (Norfolk) 125m. N.
<i>AN08212</i>	f.g. ♀ ×	1.11.64 15.6.65	Niton: 50°35'N. 1°16'W. Isle of Wight (Hampshire) DAW La Chapelle: 47°17'N. 1°17'W. (Loire-Atlantique) France

Garden Warbler (*Sylvia borin*) (13; 5 miles; 2½ years)

<i>AX43018</i>	ad. +	5.10.65 25.10.65	Isle of May Baracaldo: 43°17'N. 2°59'W. (Vizcaya) Spain
<i>AK99810</i>	ad. v	3.9.65 15.9.65	Redcar: 54°37'N. 1°04'W. (York) EEJ Ushant: 48°28'N. 5°04'W. (Finistère) France
<i>SC75765</i>	f.g. +	25.7.64 26.8.65	Ilkley: 53°56'N. 1°49'W. (York) WNS Chillarón del Rey: c. 40°34'N. 2°44'W. (Guadalajara) Spain
<i>AN09138</i>	f.g. ×	8.8.64 (6.10.65)	Adel: 53°52'N. 1°35'W. Leeds (York) ADF '70 km. from Lisbon' Portugal
<i>SC61438</i>	juv. +	4.8.63 (23.4.65)	Walcot: 52°42'N. 2°32'W. Wellington (Shropshire) JML La Carlota: 37°41'N. 4°56'W. (Córdoba) Spain
<i>HA51270</i>	juv. ×	30.8.65 13.9.65	Benacre: 52°21'N. 1°43'E. (Suffolk) AGH Cropwell Bishop, Bingham (Nottingham) 115m. WNW.
<i>SC99653</i>	1st W. +	30.8.64 (6.9.65)	Frampton-on-Severn: 51°46'N. 2°22'W. (Gloucester) AC Los Barrios: 36°11'N. 5°30'W. (Cádiz) Spain
<i>AE40075</i>	f.g. ()	14.6.62 15.5.65	Oakhill: 51°24'N. 1°35'W. (Wiltshire) PMD near Beni-Mellal: 32°22'N. 6°29'W. Morocco
<i>SC91298</i>	ad. v	20.7.64 7.5.65	Winchester: 51°04'N. 1°19'W. (Hampshire) WC Dungeness (Kent) 98m. E.
<i>AR40738</i>	juv. ×	24.7.65 10.9.65	Slapton: 50°17'N. 3°39'W. (Devon) SLBO Sax: 38°32'N. 0°49'W. (Alicante) Spain

This is the most interesting series of Garden Warbler recoveries ever reported in a single year.

Whitethroat (*Sylvia communis*) (41; 100 miles; 3½ years)

<i>AK27822</i>	ad. ♂ +	30.5.64 25.9.65	Felton: 55°18'N. 1°42'W. (Northumberland) B&C Oporto: 41°10'N. 8°37'W. (Douro Litoral) Portugal
<i>N94745</i>	ad. ♀ ×	10.5.64 8.5.65	Calf of Man Thorpeness (Suffolk) 300m. ESE.
<i>AS94029</i>	ad. ♀ ×	18.5.65 20.7.65	Calf of Man Shevington, Wigan (Lancashire) 90m. ESE.
<i>HA97550</i>	juv. ×	14.8.65 4.9.65	Freshfield: 53°34'N. 3°05'W. Formby (Lancashire) MRG Villenave-d'Ornon: 44°47'N. 0°32'W. (Gironde) France
<i>AX29028</i>	ad. +	15.8.65 19.9.65	Adwick-le-Street: 53°34'N. 1°11'W. (York) ARS Monforte: 42°32'N. 7°30'W. (Lugo) Spain
<i>AS65250</i>	ad. ♀ +	12.9.65 0.10.65	Gibraltar Point Sanlúcar: 36°46'N. 6°21'W. (Cádiz) Spain
<i>AS48127</i>	f.g. ♀ ×	2.5.65 0.9.65	Bardsey Ferragudo: 37°07'N. 8°31'W. (Algarve) Portugal
<i>N16665</i>	juv. +	23.9.62 15.9.65	near Sutton Bridge: 52°44'N. 0°11'E. (Lincoln) M&B São Pedro: 41°46'N. 6°45'W. (Tras os Montes) Portugal
<i>AS68146</i>	pull. +	5.6.65 18.9.65	Coombe: 52°25'N. 1°30'W. Coventry (Warwick) AWE Plencia: 43°24'N. 2°56'W. (Vizcaya) Spain

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51526	ad. /?/	9.6.64 (18.10.65)	Pershore: 52°07'N. 2°05'W. (Worcester) SKT Ameixial: 37°22'N. 7°58'W. (Algarve) Portugal
9215	1st S. ♂ v	8.5.63 11.5.65	Great Saltee Calf of Man 155m. NE.
3823	1st W. x	22.8.65 8.9.65	Frampton: 51°46'N. 2°22'W. (Gloucester) AC Oleirinhos: 41°51'N. 6°45'W. (Tras os Montes) Portugal
794	ad. ♀ x	14.7.64 19.9.65	Skokholm La Bernerie: 47°05'N. 2°01'W. (Loire-Atlantique) France
32541	1st W. +	24.7.64 2.9.65	Haverling: 51°37'N. 0°11'E. Romford (Essex) JEF Abanto y Ciervana: 43°22'N. 3°07'W. (Vizcaya) Spain
32991	ad. ♂ x	5.9.64 c. 7.6.65	Haverling JEF Buttermere (Cumberland) 245m. NW.
6831	ad. ♀ /?/	29.5.65 19.10.65	Haverling JEF Azenmouro: 33°16'N. 8°23'W. (Casablanca) Morocco
0079	1st W. x	18.8.65 16.10.65	Haverling JEF Casablanca: 33°39'N. 7°35'W. Morocco
2866	ad. ♀ +	8.7.62 16.10.65	Hampstead Heath: 51°34'N. 1°10'W. (London) RWG Jerez de la Frontera: 36°41'N. 6°07'W. (Cádiz) Spain
74	juv. +	7.8.65 8.9.65	Elm Park: 51°33'N. 0°12'E. Romford (Essex) RRS Ortuella: 43°19'N. 3°04'W. (Vizcaya) Spain
08	juv. x	22.8.65 (7.10.65)	Elm Park RRS Canecas: 38°49'N. 9°14'W. (Estremadura) Portugal
2361	juv. +	9.8.65 early 10.65	Stockbury: 51°20'N. 0°41'E. (Kent) MKRG Leiria: 39°45'N. 8°50'W. (Beira Litoral) Portugal
9296	juv. +	17.7.65 24.8.65	Blagdon Reservoir: 50°59'N. 3°07'W. (Somerset) PJC Rebordãos: 41°44'N. 6°49'W. (Tras os Montes) Portugal
504	f.g. ♀ x	7.5.64 8.8.65	Dungeness Guisborough (York) 260m. NNW.
7596	1st W. +	6.9.65 15.10.65	Dungeness Deilão: 41°51'N. 6°35'W. (Tras os Montes) Portugal
3533	f.g. +	22.8.65 5.9.65	Eastbourne: 50°46'N. 0°17'E. (Sussex) RHC San Sebastian: 43°19'N. 2°00'W. (Guipúzcoa) Spain
9492	ad. +	9.5.65 5.10.65	Beachy Head: 50°44'N. 0°16'E. (Sussex) BHRS Sargaçal: 37°08'N. 8°40'W. (Algarve) Portugal
2270	1st W. x	22.8.65 autumn 1965	Beachy Head BHRS Allo: 42°34'N. 2°01'W. (Navarra) Spain
939	juv. +	12.9.65 17.10.65	Beachy Head BHRS Olivais: 38°46'N. 9°06'W. (Estremadura) Portugal
104	f.g. +	19.9.65 20.10.65	Beachy Head BHRS Setúbal: 38°31'N. 8°54'W. (Estremadura) Portugal

most twice as many more foreign recoveries were reported in 1965 than in any previous year. There is only one previous recovery from Morocco.

Lesser Whitethroat (*Sylvia curruca*) (8; 60 miles; 1 $\frac{3}{12}$ years)

4932	ad. +	17.7.65 18.9.65	Offerton: 53°25'N. 2°09'W. Stockport (Cheshire) S&B Rovereto: 45°53'N. 11°03'E. (Trento) Italy
2269	ad. x A	26.6.64 14.11.65	Harold Hill: 51°37'N. 0°13'E. Romford (Essex) JEF Valrovina: 45°47'N. 11°41'E. (Vicenza) Italy
33	juv. x	3.7.65 (22.9.65)	Cliffe: 51°28'N. 0°30'E. (Kent) NKRK Tolmezzo-Fusca: 46°24'N. 13°01'E. (Udine) Italy

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AX13550	f.g. /?/	22.8.65 6.11.65	Eastbourne: 50°46'N. 0°17'E. (Sussex) RHC near Alexandria: 31°13'N. 29°55'E. Egypt
AN84481	f.g. x	5.9.64 12.7.65	Beachy Head: 50°44'N. 0°16'E. (Sussex) BHRS Stratton St. Margaret, Swindon (Wiltshire) 100m. WNW.

AX13550 is the first British-ringed bird to be recovered in Egypt, and Udine is the most easterly Italian locality from which a Lesser Whitethroat has been reported.

Willow Warbler (*Phylloscopus trochilus*) (38; 15 miles; 1 $\frac{11}{12}$ years)

AK85962	ad. x	13.5.65 10.10.65	Isle of May Ben-Ahmed: 33°07'N. 7°17'W. (Casablanca) Morocco
AR86270	f.g. v	24.7.65 16.8.65	Bamburgh: 55°36'N. 1°42'W. (Northumberland) BRS Chichester (Sussex) 330m. S.
AN83827	pull. v	18.6.65 16.8.65	Ochiltree: 55°28'N. 4°23'W. (Ayr) JSP Sandwich Bay (Kent) 370m. SE.
AN58816	ad. v	12.9.64 7.5.65	Low Hauxley: 55°19'N. 1°33'W. (Northumberland) NRG Minsmere (Suffolk) 250m. SE.
SC76311	juv. +	2.8.64 0.9.65	Ilkley: 53°56'N. 1°49'W. (York) WNS Cercedilla: 40°44'N. 4°04'W. (Madrid) Spain
AS23427	f.g. x	17.8.65 c. 11.12.65	Spurn Point Castro Verde: 37°42'N. 8°05'W. (Baixo Alentejo) Portugal
AK95381	ad. v	9.5.64 3.5.65	Hilbre: 53°23'N. 3°14'W. (Cheshire) HBO Bardsey (Caernarvon) 80m. WSW.
HA36617	f.g. x	6.9.65 11.9.65	Knutsford: 53°18'N. 2°23'W. (Cheshire) S&B Bristol 130m. S.
AN11342	pull. x	8.6.65 (26.8.65)	Llanfair Talhaiarn: 53°13'N. 3°36'W. (Denbigh) AEM Gloucester 110m. SSE.
P48825	juv. x	26.8.65 20.9.65	Gibraltar Point '50 km. south of Lisbon': c. 38°25'N. 9°12'W. Portugal
H80947	1st W. /?/	3.8.63 4.4.65	Bardsey Fès: 34°05'N. 5°00'W. Morocco
N33934	f.g. ()	9.4.64 10.8.65	Bardsey Algorta: 43°20'N. 3°00'W. (Vizcaya) Spain
N33957	f.g. x	11.4.64 28.4.65	Bardsey East Vlieland: 53°18'N. 5°05'E. Frisian Islands, Netherlands
N97779	f.g. /?/	13.8.64 28.8.64	Bardsey near Bilbao: 43°15'N. 2°56'W. (Vizcaya) Spain
HA01050	f.g. +	4.8.65 25.8.65	Gailey: 52°42'N. 2°08'W. (Stafford) C&PM Santa Cruz: 42°40'N. 2°20'W. (Alava) Spain
P46105	juv. x	16.8.64 25.5.65	Hoddesdon: 51°47'N. 0°00' (Hertford) RMRG Riding Mill, Hexham (Northumberland) 240m. NNW.
AR73429	f.g. +	6.8.65 23.10.65	Froxfield: 51°25'N. 1°35'W. (Wiltshire) PMD Basauri: 43°13'N. 2°54'W. (Vizcaya) Spain
N95999	pull. +	6.7.64 2.9.65	Haslemere: 51°06'N. 0°42'W. (Surrey) PGD Caldelas: 41°29'N. 8°22'W. (Minho) Portugal
25958	f.g. +	20.8.57 c. 1960	Dungeness Segovia: 40°47'N. 4°07'W. Spain
N27147	1st W. x	19.8.63 21.7.65	Dungeness near Mullingar (Westmeath) 390m. WNW.

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764 1stW. 7.9.63 Dungeness
 × 5.5.65 Fredericia: 55°34'N. 9°47'E. (Jylland) Denmark

eral of the recoveries are of particular interest in showing the routes followed
 ough the British Isles. The record from the Netherlands is unique and there is
 7 one previous recovery of a Willow Warbler in Denmark. The recovery date
 AS23427 is exceptionally late.

Chiffchaff (*Phylloscopus collybita*) (14; 40 miles; 1½ years)

57 f.g. 26.9.65 Calf of Man
 /?/ 14.10.65 Las Arenas: 43°18'N. 3°01'W. (Vizcaya) Spain
 6938 juv. 31.7.65 Havering: 51°37'N. 0°11'E. Romford (Essex) JEF
 + (26.10.65) Alcalá: 36°29'N. 5°43'W. (Cádiz) Spain
 6490 f.g. 28.9.65 Steep Holm: 51°21'N. 3°07'W. (Somerset) SHT
 × (22.10.65) Vergara: 43°07'N. 2°25'W. (Guipúzcoa) Spain
 22 juv. 18.7.65 Winchester: 51°04'N. 1°19'W. (Hampshire) WC
 v 5.9.65 Beachy Head (Sussex) 70m. ESE.
 93 f.g. 2.10.65 Dungeness
 /?/ 23.10.65 Vila Nova da Barquinha: 39°27'N. 8°25'W. (Ribatejo) Portugal
 7922 f.g. 28.9.64 Shoreham-by-Sea: 50°50'N. 0°16'W. (Sussex) DAS
 /?/ 26.10.65 Zarauz: 43°17'N. 2°10'W. (Guipúzcoa) Spain
 557 1stW. 7.9.65 East Boldre: 50°47'N. 1°33'W. (Hampshire) NDP
 + 12.10.65 Fuente del Maestre: 38°31'N. 6°28'W. (Badajóz) Spain
 9052 f.g. 7.10.65 Eastbourne: 50°46'N. 0°17'E. (Sussex) DDH
 + 20.10.65 Madrid: 40°25'N. 3°45'W. Spain

Goldcrest (*Regulus regulus*) (4; 30 miles; ½ year)

781 f.g. ♂ 9.10.65 Blakeney: 52°59'N. 0°59'E. (Norfolk) RGHC
 v 17.10.65 High Halstow (Kent) 105m. S.
 352 f.g. ♂ 10.10.64 Havering: 51°37'N. 0°11'E. Romford (Essex) JEF
 v 29.3.65 Calf of Man 270m. NW.
 328 f.g. ♀ 4.10.64 Shipham: 51°18'N. 2°48'W. Cheddar (Somerset) TBS
 v 14.4.65 Copeland Islands (Down) 255m. NNW.

Spotted Flycatcher (*Muscicapa striata*) (12; 5 miles; 2½ years)

74 ad. 23.5.64 Calf of Man
 + 5.9.65 Cutamilla: 41°01'N. 2°45'W. (Guadalajara) Spain
 564 ad. 1.8.65 Maltby: 53°26'N. 1°11'W. (York) RJR
 + 3.9.65 St. Etienne: 43°11'N. 1°20'W. (Basses-Pyrénées) France
 258 1stW. 3.9.65 Minsmere: 52°14'N. 1°37'E. (Suffolk) HEA
 + 25.9.65 Tivoli: 41°57'N. 12°48'E. (Rome) Italy
 506 pull. 17.7.65 Frampton: 51°46'N. 2°22'W. (Gloucester) AC
 + 2.10.65 Quintanilha: 41°45'N. 6°35'W. (Tras os Montes) Portugal
 523 ad. 5.9.65 Cholsey: 51°34'N. 1°09'W. (Berkshire) OOS
 () 20.9.65 Bilbao: 43°15'N. 2°55'W. (Vizcaya) Spain

958 is only the second British-ringed Spotted Flycatcher to be recovered in

Pied Flycatcher (*Ficedula hypoleuca*) (13; 70 miles; 1 year)

92 f.g. 5.9.65 Bamburgh: 55°36'N. 1°42'W. (Northumberland) BRS
 + 20.10.65 Samel: 40°27'N. 8°34'W. (Beira Litoral) Portugal



MAP 6. All recoveries of Goldcrests *Regulus regulus* showing movement of more than 30 miles
(drawn by R. C. Fankner)

AS94723	1st W. /?	28.9.65 (11.10.65)	Calf of Man Entroncamento: 39°28'N. 8°28'E. (Ribatejo) Portugal
AN94956	f.g. ×	4.9.65 26.9.65	Lowestoft: 52°29'N. 1°45'E. (Suffolk) RWC Ciboure: 43°23'N. 1°41'W. (Basses-Pyrénées) France
HA51765	f.g. +	3.9.65 18.10.65	Benacre: 52°21'N. 1°43'E. (Suffolk) AGH Lagares: 40°24'N. 7°52'W. (Beira Alta) Portugal
HA51779	f.g. +	3.9.65 15.9.65	Benacre AGH Cap Ferret: 44°37'N. 1°15'W. (Gironde) France
P20877	pull. +	13.6.65 14.9.65	Forest of Dean: 51°48'N. 2°35'W. (Gloucester) EGI Leiria: 39°45'N. 8°49'W. (Beira Litoral) Portugal
11B11138	1st W. ♂ ×	28.8.65 20.9.65	Sandwich Bay near Lisbon: c. 38°45'N. 9°10'W. Portugal

Four of these were ringed at the time of a massive arrival on the east coast in early September 1965 (see P. Davis, *Brit. Birds*, 59: 353-376).

Dunnock (*Prunella modularis*) (189; 20 miles; 7 $\frac{8}{12}$ years)

AR86904	f.g. ×	8.9.65 31.12.65	Bamburgh: 55°36'N. 1°42'W. (Northumberland) BRS St. Abbs, Coldingham (Berwick) 25m. NW.
AR57426	f.g. ×	18.2.65 (10.6.65)	Venus Pool: 52°40'N. 2°40'W. Shrewsbury (Shropshire) PJM Doxey (Stafford) 25m. E.
P48333	ad. ×	11.4.65 16.4.65	Gibraltar Point Gedney, Long Sutton (Lincoln) 27m. SSW.

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Meadow Pipit (*Anthus pratensis*) (27; 4 $\frac{11}{12}$ years)

Seven recoveries in France, Spain and Portugal will be tabulated in a future report.

Rock Pipit (*Anthus spinoletta*) (8; 40 miles; 8 $\frac{4}{12}$ years)

1856	f.g.	13.8.65	Fair Isle
	×	15.12.65	Tynemouth (Northumberland) 310m. S.
9	f.g.	16.9.60	Lundy
	×	1.7.65	near Brittas Bay (Wicklow) 130m. NNW.

Pied/White Wagtail (*Motacilla alba*) (74; 150 miles; 7 $\frac{2}{12}$ years)

3533	juv.	28.8.65	Kirkburton: 53°37'N. 1°42'W. (York) TDB
	+	23.12.65	Montemolin: 38°10'N. 6°13'W. (Badajóz) Spain
7251	juv.	23.8.64	Kirkburton TDB
	/?/	6.1.65	Rio Maior: 39°12'N. 8°43'W. (Ribatejo) Portugal
3803	f.g.	25.9.64	Doncaster: 53°32'N. 1°07'W. (York) RM
	+	20.3.65	Mouriscas: 39°30'N. 8°05'W. (Ribatejo) Portugal
4986	juv.	4.7.64	Offerton: 53°25'N. 2°10'W. (Cheshire) S&B
	+	8.2.65	Oporto: 41°08'N. 8°37'W. (Douro Litoral) Portugal
7383	juv.	14.8.64	Knutsford: 53°18'N. 2°23'W. (Cheshire) S&B
	×	26.2.65	St. André: 45°00'N. 0°27'W. (Gironde) France
2394	juv.	16.8.64	Knutsford S&B
	+	21.2.65	Azinhaga: 39°20'N. 8°32'W. (Ribatejo) Portugal
1816	pull.	24.5.64	Goyt Valley: 53°16'N. 1°59'W. Buxton (Derby) S&B
	+	25.11.65	Cruz: 41°11'N. 8°40'W. (Douro Litoral) Portugal
0518	f.g.	29.8.63	Withington: 53°13'N. 2°17'W. (Cheshire) S&B
	+	(12.11.65)	Figueira: 40°09'N. 8°51'W. (Beira Litoral) Portugal
790	juv.	9.7.64	Abberton
	+	c. 25.1.65	Figueira, Portugal
2:126	juv.	7.7.65	Great Holland: 51°49'N. 1°13'E. (Essex) DW
	v	6.10.65	Ahetze: 43°26'N. 1°35'W. (Basses-Pyrénées) France
6	f.g. ♀	12.4.64	Skokholm
	×	(21.1.65)	Narón: 43°31'N. 8°09'W. (Coruña) Spain
605	1st W. ♂	3.10.65	Winchester: 51°04'N. 1°19'W. (Hampshire) WC
	×	10.11.65	La Planche: 47°01'N. 1°26'W. (Loire-Atlantique) France

Yellow Wagtail ssp. (*Motacilla flava*) (23; 50 miles; 3 $\frac{8}{12}$ years)

610	juv.	1.8.65	Wigan: 53°33'N. 2°38'W. (Lancashire) MRG
	v	31.8.65	Ushant: 48°28'N. 5°05'W. (Finistère) France
301	f.g.	25.9.64	Doncaster: 53°32'N. 1°08'W. (York) RM
	+	c. 18.9.65	Salreu: 40°44'N. 8°33'W. (Beira Litoral) Portugal
153	pull.	9.6.62	Shotton: 53°12'N. 3°02'W. (Flint) MRG
	×	11.4.65	Jesús-Tortosa: 40°49'N. 0°31'E. (Tarragona) Spain
577	1st W. ♂	2.9.64	Attenborough: 52°54'N. 1°14'W. (Nottingham) BB&K
	v	16.7.65	Low Row, Reeth (York) 105m. N.
648	ad. ♂	26.6.65	Walcot: 52°42'N. 2°32'W. (Shropshire) RES
	+	c. 0.12.65	near Bilbao: 43°15'N. 2°56'W. (Vizcaya) Spain
550	ad. ♀	23.7.63	Llanigon: 52°03'N. 3°09'W. (Brecon) JLSC
	+	10.9.65	Bustos: 40°30'N. 8°36'W. (Beira Litoral) Portugal
	juv.	15.8.61	Abberton
	+	20.3.65	Alfaro: 42°11'N. 1°45'W. (Logroño) Spain

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641159	juv.	19.6.62	Abberton
	+	12.10.65	Chipiona: 36°44'N. 6°26'W. (Cádiz) Spain
AS31045	juv. ♂	13.9.64	Abberton
	v	16.4.65	Le Barcarès: 42°47'N. 3°02'E. (Pyrénées-Orientales) France
P46927	juv.	5.8.65	Hoddesdon: 51°47'N. 0°00' (Hertford) RMRG
	+	8.10.65	Casal de Pianos: 38°53'N. 9°26'W. (Estremadura) Portugal
AX21664	1stW.	30.8.65	Thorpe: 51°25'N. 0°31'W. Chertsey (Surrey) GHG
	()	c. 1.12.65	near Thiès: 14°49'N. 16°52'W. Sénégal
N46817	1stW. ♂	15.9.63	Chichester: 50°50'N. 0°48'W. (Sussex) CRG
	+	9.10.65	Porto da Carne: 40°36'N. 7°18'W. (Beira Alta) Portugal
AA17593	1stW.	22.8.64	Farlington: 50°50'N. 1°02'W. (Hampshire) DFB
	+	5.10.65	Algés: 38°42'N. 9°14'W. (Estremadura) Portugal
AN79380	1stW. ♂	17.8.65	Stanpit: 50°44'N. 1°44'W. (Hampshire) CHRS
	x	(21.9.65)	Praia de Mira: 40°27'N. 8°48'W. (Beira Litoral) Portugal
AH89225	ad. ♂	17.7.64	Stanpit CHRS
	[?]	(0.1.65)	Aveiro: 40°38'N. 8°39'W. (Beira Litoral) Portugal

AX21664 is the most southerly recovery so far reported for this species.

Waxwing (*Bombycilla garrulus*) (2; 19 days)

BC14870	f.g.	21.11.65	Low Hauxley: 55°19'N. 1°33'W. (Northumberland) NRG
	x	(10.12.65)	Thorne, Doncaster (York) 120m. S.
BA86711	f.g.	7.11.65	Spurn Point
	x	14.11.65	Arkendale, Knaresborough (York) 67m. WNW.

Starling (*Sturnus vulgaris*) (1,286; 10 $\frac{6}{12}$ years)

A total of 220 foreign recoveries will be tabulated in a future report. Published in full below are the most northerly and easterly recoveries and all long-distance movements by Starlings of presumed British stock.

CX30366	juv.	6.7.64	Fair Isle
	x	1.4.65	at sea, c. 57°35'N. 7°30'E. off Norway
CB75226	1stW. ♂	20.2.65	Beacon Fell: 53°53'N. 2°39'W. (Lancashire) MBRG
	x	8.5.65	Nousu: 67°09'N. 28°40'E. (Lappi) Finland
84159R	juv.	6.6.64	Sleaford: 52°59'N. 0°25'W. (Lincoln) GA
	v	(24.3.65)	Dalkeith (Midlothian) 225m. NW.
CX38211	ad.	8.7.64	Ewhurst: 51°09'N. 0°26'W. (Surrey) L&JW
	+	9.10.65	St. Sauveur: 49°36'N. 0°18'E. (Seine-Maritime) France
CK31722	f.g. ♂	7.1.63	Littlestone: 50°59'N. 0°58'E. (Kent) DBO
	x	2.5.65	Prehistoye: 58°25'N. 40°20'E. (Yaroslavl) U.S.S.R.
CX23674	juv.	14.6.64	Dungeness
	+	6.1.65	St. Guénolé: 47°49'N. 4°22'W. (Finistère) France
CX23678	juv.	14.6.64	Dungeness
	+	8.11.65	Audinghem: 50°51'N. 1°36'E. (Pas-de-Calais) France

Greenfinch (*Carduelis chloris*) (714; 150 miles; 8 $\frac{4}{12}$ years)

89007S	ad. ♂	17.4.62	Spurn Point
	v	1.5.63	Croix: 50°40'N. 3°09'E. (Nord) France
R45386	ad. ♀	19.5.59	Bromborough: 53°19'N. 2°59'W. (Cheshire) N11
	x	28.1.65	Dublin 140m. W.
BA55937	1stW. ♂	10.3.65	Bicknor: 51°18'N. 0°40'E. (Kent) MKRG
	x (car)	18.7.65	between Bridlington and Scarborough (York) c. 200m. N.

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733	ad. ♂	28.12.64	Sevenoaks: 51°16'N. 0°12'E. (Kent) RDI
	×	(25.1.65)	Fruges: 50°31'N. 2°08'E. (Pas-de-Calais) France
55-	f.g.	28.1.65	Dungeness
	v	13.11.65	Staden: 50°58'N. 3°01'E. (West Flanders) Belgium

Goldfinch (*Carduelis carduelis*) (53; 100 miles; 4 $\frac{9}{12}$ years)

2448	juv.	22.8.64	Kirby-le-Soken: 51°52'N. 1°13'E. (Essex) JKW
	()	14.11.65	Ceuta: 35°53'N. 5°19'W. N.W. Africa
	×	c. 15.12.65	Ceuta
0666	1stW.	11.8.64	East Boldre: 50°47'N. 1°33'W. (Hampshire) NDP
	v	1.5.65	Fuenterrabia: 43°21'N. 1°48'W. (Guipúzcoa) Spain
	+	8.11.65	Mimizan: 44°12'N. 1°14'W. (Landes) France

2448 is the first recovery of a British-ringed finch in Africa.

Table L—Countries and months of recoveries of Goldfinches

of recovery	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1(1)	—	—	—	—	—	—	—	—	—	1	—	—
14*)	4	2	1	1	1	—	—	—	—	1	2	1
2)	2	2	—	1	1	—	1	—	—	1	2	2

*Total includes one undated record
See footnote to table A

Siskin (*Carduelis spinus*) (1; $\frac{6}{12}$ year)

528	f.g. ♀	7.2.65	Colchester: 51°53'N. 0°53'E. (Essex) AJW
	v	19.8.65	Hässleholm: 56°09'N. 13°46'E. (Kristianstad) Sweden

is the first Swedish recovery of a British-ringed Siskin.

Linnet (*Acanthis cannabina*) (116; 100 miles; 4 $\frac{6}{12}$ years)

22	1stW.	26.9.65	Freshfield: 53°34'N. 3°06'W. Formby (Lancashire) MRG
	v(=♀)	16.10.65	Portland Bill 210m. S.
16	ad. ♀	11.7.65	Dungeness
	+	c. 15.10.65	Bragança: 41°47'N. 6°46'W. (Tras os Montes) Portugal
10	f.g. ♂	27.10.64	Portland Bill
	×	(3.6.65)	near Rushden (Northampton) 140m. NE.

Table M—Countries and months of recoveries of Linnets

of recovery	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(1)	—	—	—	—	—	—	—	—	—	1	—	—
9)	3	2	2	1	—	—	—	—	1	22	16	2
*)	2	—	3	3	—	—	—	—	1	2	5	1

See footnote to table A

is only one previous recovery of a British-ringed Linnet in Portugal.

Redpoll (*Acanthis flammea*) (36; 100 miles; 3 $\frac{3}{12}$ years)

Table O—Countries and months of recoveries of Redpolls

of recovery	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ids (3)	—	—	—	—	—	—	1	—	—	1	1	—
(22)	1	—	—	—	—	—	—	—	—	12	9	—
)	—	1	2	—	—	—	—	—	—	—	—	—

See footnote to table A

of the recoveries in France are unusually far south-east and are given in full.

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<i>P43827</i>	juv. ♂ +	6.9.64 24.3.65	Howick: 55°27'N. 1°36'W. (Northumberland) PRE Little Barton, Canterbury (Kent) 310m. SSE.
<i>AHJ2201</i>	ad. ♀ ×	25.4.64 c. 8.3.65	Cramlington: 55°04'N. 1°37'W. (Northumberland) TTRG St. Didier: 44°36'N. 4°29'E. (Ardèche) France
<i>AR81692</i>	ad. ♀ ×	13.3.65 14.6.65	Maltby: 53°26'N. 1°11'W. (York) PH Greenhead, Haltwhistle (Northumberland) 115m. NNW.
<i>AR27107</i>	1st W. ♂ ×	19.9.64 c. 26.2.65	Gibraltar Point Le Bousquet: 43°32'N. 3°10'E. (Hérault) France

Bullfinch (*Pyrrhula pyrrhula*) (140; 50 miles; 6 $\frac{3}{12}$ years)

<i>AX35466</i>	1st W. ♂ v	17.10.65 28.11.65	Cantley: 53°31'N. 1°04'W. Doncaster (York) BMB Theddlethorpe (Lincoln) 52m. E.
<i>SE06911</i>	1st W. ♀ +	15.11.64 4.11.65	King's Stanley: 51°43'N. 2°16'W. (Gloucester) KJG Goudhurst, Cranbrook (Kent) 120m. ESE.

Chaffinch (*Fringilla coelebs*) (95; 250 miles; 6 $\frac{9}{12}$ years)

Table P—Countries and months of recoveries of Chaffinches

Country of recovery	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Belgium (5)	—	—	—	—	—	—	—	—	—	4	1	—
Netherlands (5)	2	—	—	1	—	—	—	—	—	—	2	—
Germany (1)	—	—	—	—	—	—	1	—	—	—	—	—
Denmark (1)	—	—	—	—	—	1	—	—	—	—	—	—
Norway (3)	—	—	—	—	1	—	1	—	1	—	—	—
Sweden (4)	—	—	—	1	—	1	—	1	1	—	—	—
Finland (1)	—	—	—	—	—	—	—	1	—	—	—	—

See footnote to table A

Brambling (*Fringilla montifringilla*) (10; 40 miles; 2 $\frac{10}{12}$ years)

<i>AH61497</i>	f.g. ♂ v	27.3.64 23.1.65	Mere: 53°19'N. 2°24'W. Knutsford (Cheshire) S&B Chertal: 50°41'N. 5°40'E. (Liège) Belgium
<i>AE05103</i>	ad. ♂ ×	23.3.62 6.2.65	Burton: 53°16'N. 3°02'W. (Cheshire) MRG St. Symphorien: 44°25'N. 0°30'W. (Gironde) France
<i>AK43204</i>	ad. ♀ ()	4.1.63 c. 0.10.64	Bletchley: 52°00'N. 0°46'W. (Buckingham) DJE Malcésine: 45°46'N. 10°49'E. (Verona) Italy
<i>SC78266</i>	1st W. ×	31.3.64 10.1.65	Lane End: 51°37'N. 0°48'W. (Buckingham) SBRG Åshøj: 55°26'N. 12°08'E. (Sjælland) Denmark
<i>N28129</i>	1st W. ♀ v	2.2.63 17.10.65	Elm Park: 51°33'N. 0°12'E. Romford (Essex) RRS Turnhout: 51°19'N. 4°57'E. (Antwerpen) Belgium
<i>AK52246</i>	1st W. ♀ ×	13.1.63 1.1.65	Bridgend: 51°31'N. 3°35'W. (Glamorgan) RGK Schwarzenbek: 53°29'N. 10°28'E. (Schleswig-Holstein) Ger- many
<i>E92763</i>	f.g. ♀ ×	19.1.63 c. 3.3.65	Langley Marish: 51°31'N. 0°34'W. (Buckingham) GTN Sernoussac: 45°23'N. 0°37'W. (Charente-Maritime) France

Recoveries of Bramblings in southern France are exceptional and there is no previous record of a British-ringed one in Italy. (An earlier record, from Yugoslavia in July 1933, has been challenged on the grounds that the species is not present in that country in summer.)

Yellowhammer (*Emberiza citrinella*) (19; 10 miles; 4 $\frac{11}{12}$ years)

<i>78355</i>	ad. ♂ ×	16.2.60 6.2.65	Minsmere: 52°14'N. 1°37'E. (Suffolk) HEA Senlis: 49°12'N. 2°35'E. (Oise) France
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ged Yellowhammers seldom move even as much as ten miles, and this is the foreign recovery.

Reed Bunting (*Emberiza schoeniclus*) (37; 30 miles; 5 $\frac{6}{12}$ years)

65	juv.	28.8.64	Chichester: 50°50'N. 0°48'W. (Sussex)	CRG
	v (=♀)	17.10.65	near Christchurch (Hampshire) 45m. W.	

House Sparrow (*Passer domesticus*) (345; 50 miles; 9 $\frac{3}{12}$ years)

6842	f.g. ♀	12.10.64	Spurn Point	
	×	(6.4.65)	Newton, Guisborough (York) 80m. NW.	
6625	f.g. ♀	15.10.65	Spurn Point	
	v	19.12.65	Worsley, Manchester (Lancashire) 100m. W.	
6282	1stW. ♀	10.10.64	Gibraltar Point	
	×	6.4.65	North Wheatley, Retford (Nottingham) 50m. W.	
6411	1stW. ♀	18.10.64	Gibraltar Point	
	+	3.2.65	Leeds (York) 90m. WNW.	
2801	f.g. ♂	20.11.64	Gibraltar Point	
	×	(25.4.65)	Cottingham (York) 55m. NW.	
16	ad. ♂	28.5.60	Bradwell	
	×	24.4.65	Alton, Stoke-on-Trent (Stafford) 160m. NW.	
4928	f.g. ♂	8.4.64	Dungeness	
	()	11.6.65	Bubry: 47°58'N. 3°10'W. (Morbihan) France	

There have been only two previous foreign recoveries of House Sparrows, both of which were just across the English Channel. The record above cannot be doubted, however, for the ring was returned and the finder described the bird as a 'moineau'.

Tree Sparrow (*Passer montanus*) (31; 30 miles; 3 $\frac{11}{12}$ years)

4353	ad.	15.8.65	Knaresborough: 54°01'N. 1°28'W. (York)	KRS
	v	6.11.65	Hornsea (York) 52m. E.	
017	f.g.	16.3.65	Spurn Point	
	v	3.4.65	Gibraltar Point 36m. S.	
0584	1stW.	9.10.64	Spurn Point	
	×	13.6.65	Haxby (York) 55m. WNW.	
6357	f.g.	17.10.64	Gibraltar Point	
	×	10.2.65	East Halton (Lincoln) 45m. NW.	

KEY TO RINGERS' INITIALS IN LIST OF RECOVERIES

DRA	D. R. Anderson	MB	M. Boddy
GA	G. Atkin	RGBB	R. G. B. Brown
HEA	H. E. Axell	TAB	T. A. Bowbeer
BMB	B. M. Baxter	TDB	T. D. Bisiker
CJB	C. J. Booth	AC	A. Cumber
CTB	C. T. Beverley	BC	B. Campbell
DFB	D. F. Billett	CEJC	C. E. J. Carter
EB	E. Balfour	DC	D. Cabot
EBr	E. Brun	DBC	Dingle Bird Club
FKB	F. K. Bennett	JCC	J. C. Coulson
GRB	G. R. Bennett	JFC	J. F. Cooper
HB	H. Barlow	JLSC	J. L. S. Cobb
JAB	J. A. Benington	PJC	P. J. Chadwick
JASB	J. A. S. Borrett	PRC	P. R. Catchpole

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RC	R. Chestney	PJM	P. J. Mawby
RGHC	R. G. H. Cant	PPM	P. P. Mackie
RHC	R. H. Charlwood	RM	R. Moat
RWC	R. W. Coleman	GTN	G. T. Nelson
WC	Winchester College	MHN	M. H. Ness
WAC	W. A. Cook	ABO	A. B. Old
AAD	A. A. Dunthorn	CBO	Copeland Bird Observatory
AWD	A. W. Diamond	DBO	Dungeness Bird Observatory
MJD	M. J. Drakeley	HBO	Hilbre Bird Observatory
PED	P. E. Davis	HoBO	Holme Bird Observatory
PGD	P. G. Davis	SABO	St. Agnes Bird Observatory
PMD	P. M. Driver	SBBO	Sandwich Bay Bird Observatory
AWE	A. W. Evans		
DJE	D. J. Elmer	SIBO	Slapton Bird Observatory
MCWE	M. C. W. Evans	IVBP	I. V. Balfour-Paul
PRE	P. R. Evans	JSP	Rev. J. S. Phillips
ADF	A. D. Flintham	MGP	M. G. Partridge
GF	G. Felstead	NDP	N. D. Pullen
JEF	J. E. Flynn	CMR	C. M. Reynolds
MAFF	Ministry of Agriculture, Fisheries & Food	KR	K. Robinson
		PR	P. Reid
BEG	Brathay Exploration Group	RJR	R. J. Rhodes
CRG	Chichester Ringing Group	RLR	R. L. Rolfe
CIRG	Cleethorpes Ringing Group	RWR	R. W. Robson
GHG	G. H. Gush	AKS	A. K. Searle
HMG	H. Mayer-Gross	ANS	A. N. Sykes
KJG	K. J. Grearson	ARS	Adwick-le-Street Ringing Station
MBRG	Morecambe Bay Ringing Group	AS	A. N. Stephens
MKRG	Mid-Kent Ringing Group	BHRS	Beachy Head Ringing Station
MRG	Merseyside Ringing Group	BRS	Bamburgh Ringing Station
NKRG	North Kent Ringing Group	CHRS	Christchurch Harbour Ring- ing Station
NRG	Northumbria Ringing Group	CVRS	Chew Valley Ringing Station
NSRG	North Solway Ringing Group	DAS	D. A. Stone
RMRG	Rye Meads Ringing Group	KRS	Knaresborough Ringing Station
RWG	R. W. George	LNHS	London Natural History Society
SBRG	South Bucks Ringing Group	LPS	Leighton Park School
SWG	Sheppey Wader Group	OOS	Oxford Ornithological Society
TRG	Tolworth Ringing Group	RES	R. E. Simister
TTRG	Tyne/Tweed Ringing Group	RKS	R. K. Summerfield
WWRG	Wash Wader Ringing Group	RRS	Romford Ringing Station
AGH	A. G. Hurrell	RS	R. Stokoe
DDH	the late D. D. Harber	SNHS	Sorby Natural History Society
MPH	M. P. Harris	SS	Sedbergh School
JAH	J. A. Hardman	TBS	T. B. Silcocks
NH	N. Henson	WNS	Wharfedale Naturalists' Society
PH	P. Hurt	HST	H. S. Taylor
RDH	R. D. Hale	SHT	Steep Holm Trust
EGI	Edward Grey Institute	SKT	the late Miss S. K. Taylor
ARJ	A. R. Johnson	TT	T. Todd
EEJ	E. E. Jackson	WT	Wildfowl Trust
RGK	R. G. Knight	AU	Aberdeen University
AHBL	A. H. B. Lee	ABW	A. B. Wassell
JML	J. M. Langford	AJW	A. J. Waller
RRL	R. R. Lovegrove		
SL	S. Lorand		
AEM	A. E. Male		
CRM	C. R. Morrison		
JRM	J. R. Marshall		
NDM	N. D. McKee		

DAW	Mrs. D. A. Watson	C&S	Catchpole & Storey
DRW	D. R. Wilson	C&T	Cockbain & Thomason
DW	D. R. Watson	D&P	Donovan & Pickess
JKW	J. K. Weston	F&H	Fry & Horner
JNTW	J. Wilson	L&JW	L. & J. Weller
JW	J. Wagstaff	M&B	Mead & Boddy
PJW	P. J. Wilkinson	ND&N	Northumberland, Durham & Newcastle NHS
PWDW	P. W. D. Waite	PB&W	Parrack, Bell & Watson
VSU	V. S. Wiseman	S&B	Sorensen & Burgess
BB&K	Bell, Bell & Kent	SS&W	Sanderson, Summersgill & Walker
B&C	Belshaw & Colley	W&M	Watts & McConville
B&I	Boddy & Ingram	WP&M	Wilson, Ponting & McLean
C&F	Collier & Forster		
C&PM	C. & P. Minton		

Studies of less familiar birds

141. Great Bustard

Photographs by Wolfgang Gewalt and Franz Matula

(Plates 70-73)

THE RECENT PHOTOGRAPHS of the Great Bustard *Otis tarda* by M. D. England (*Brit. Birds*, 59: 22-27, plates 1-8 and colour frontispiece) showed the female at the nest, the eggs, the chicks and the breeding habitat, while the ones in this issue by Dr. Gewalt and Mr. Matula concern display, flight shots and winter feeding. The two series are thus complementary and this short text is confined to aspects not covered by M. D. England's paper.

The bustards are an Old World family, thought to be of Ethiopian origin, with eleven genera and 22 species in Africa, southern Europe, western and central Asia, and Australia; two species breed in Europe and four in the western Palearctic. The Great Bustard is locally distributed from Morocco and Iberia across southern Europe, Asia Minor, southern Siberia, Turkestan, Mongolia and Manchuria to the Amur Valley in far east Asia; there are two races, nominate *tarda* in the western two-thirds of the range and *dybrowskii* in the east. The species is largely sedentary, but also a partial migrant which winters with varying regularity south to Syria, Iraq, Iran, Afghanistan and China. It is found on grassy plains, open steppes and vast tracts of corn and other cultivation, where it feeds on cereals, brassicas, peas and other vegetable matter, as well as any voles, nestling birds, frogs, lizards, worms and grasshoppers which it happens to find.

Great Bustards have much decreased through persecution and habitat destruction. They formerly bred in England and south-east Scotland, as well as France, Denmark and southern Sweden. The last recorded nesting in Britain was in the 1830's, after which, apart from

sizeable invasions in three winters during 1870-91, the species became a rare vagrant here, so much so that the last sixty years have seen only six records, in Hampshire (1910), Orkney (1924), Co. Cork (1925), Yorkshire (1926), Shetland (1936) and then, after a gap of 27 years, Norfolk (1963), all December-March but for one in May. The species is most likely to wander in winter, though, for example, the only record this century in Finland was in July 1942. Indeed, the occurrence in Norfolk in 1963 followed an influx of up to 16 in Belgium in February and March that year (*Le Gerfaut*, 53: 323-333) which was considered to be due to the exceptionally severe weather of the 1962/63 winter. Plate 73a shows a group feeding in snow in Austria, where Great Bustards have wintered for the last fifty years—ever since, according to Mr. Matula, the cultivation of rape with its oil-bearing seeds was started there. Previously, the migrant population left when seasonal conditions made food scarce. It is estimated that there are now 350-500 Great Bustards in Austria. Mr. Matula considers that, apart from shooting, the factors which tend to keep down the numbers there are the widespread use of pesticides (ingested through animal as well as vegetable food); the increase of high tension cables which the birds are very likely to hit since they tend to fly at a height of ten to 50 metres (and at a speed of 80-90 kilometres per hour); the destruction of eggs by agricultural machinery; and the planting of wind screens of trees (this species must have open country). On the other hand, there are periodic influxes from Czechoslovakia (where, according to K. H. Voous's *Atlas of European Birds*, there was a population of 1,100 in 1956) and Hungary.

There seems nearly always to be a preponderance of females among Great Bustards, and normal-sized flocks of, say, ten to 60 may include only a quarter or a fifth of adult males. In autumn the flocks join and concentrations of several hundreds have been recorded. The young males remain in parties during the breeding season, while the mature males of four years or more join them at about the time the eggs come near to hatching. The flight studies on plate 72 bring out some of the points in P. J. Stead's paper on 'Flight patterns of the European bustards' and subsequent correspondence (*Brit. Birds*, 58: 43-47, 444).

Male Great Bustards display singly or communally, beginning well before the start of nesting and continuing long into the incubation time. Like those of other species which have a communal display, such as the Black Grouse *Lyrurus tetrix* and the Ruff *Philomachus pugnax*, the action is spectacular and involves the use of highly specialised features. It was fully described by G. E. F. Schulz in 1927 (*Beitr. FortpflBiol. Vögel*, 3: 73-76) and later filmed by H. Siewert who afterwards published his observations in 1939 (*Zeit. für Jagdkunde*, 1: 6-36). Extracts from *The Handbook's* concise summary of their observations will serve best to accompany Dr. Gewalt's remarkable

photographs on plates 70 and 71: 'the mainly sandy-coloured bird is suddenly transformed into a billowy mass of white by turning over of (mainly) the wing-coverts and tail-feathers, so as to display their white under-sides . . . tail is turned forward flat on back, displaying the loose mass of white under tail-coverts. Head is sunk on shoulders, bristly white moustachial feathers stand almost upright, gular sac is greatly distended, legs bent so that breast is lowered near ground, and wings are shaken in a curious loose fashion. Posture may last few seconds only or a considerable time and normal position may be resumed very abruptly.' The gular sac (plate 70), developed only during the breeding season and not found in females or young males, opens under the tongue and extends down the front of the neck for about nine inches. Dr. Gewalt's photographs were taken in West Berlin Zoo where this species bred successfully in captivity for the first time in 1964 after chicks hatched in 1962 and 1963 had died within five days (*Avic. Mag.*, no: 218-219).

In conclusion, I should like to acknowledge the help of the late D. D. Harber in translating Mr. Matula's notes from the German.

I. J. FERGUSON-LEES

Food of Long-eared Owls in south Lancashire

By G. Robin South

INTRODUCTION

ALTHOUGH the Long-eared Owl *Asio otus* has long been known as a breeding bird in Lancashire (Mitchell 1892, Hardy 1941, Oakes 1953), only fragmentary observations on its prey in the county were included by Ticehurst (1939) in an analysis of pellets collected in Kent, Norfolk, Cambridgeshire, Yorkshire and Lancashire. The recorded food of the Long-eared Owl was listed by Jourdain (in Witherby *et al.* 1938-41), but no recent quantitative studies appear to have been made in Britain, such as those of Armstrong (1958) for *A. o. wilsonianus* in temperate North America and of Zimmermann (1950) for the typical race in Europe.

Data for the present study were obtained in April and May 1965, when seven breeding sites and what was probably a winter roost were located in south Lancashire. One of the nest sites and the winter roost were situated in coastal dune pine forest, and the other nest sites in mossland woods. Owing to the increasingly precarious breeding status of the Long-eared Owl in Lancashire, the actual localities are not disclosed here.

Accumulations of pellets were found by searching the nesting and roosting areas and observing the habits of the owls. Samples were collected between 17th April and 9th May:

Duneland winter roost	68 pellets (+fragments)
Duneland nest site	100 pellets (+fragments)
Six mossland nest sites	52 pellets (+fragments)

All the pellets had been ejected by adult owls and at least 14 individuals were involved. Many of the nest site pellets were fresh and had been ejected by male owls roosting close to the nest, but the winter roost ones were older and could have been ejected by birds of either sex.

Whole and fragmentary pellets were separated after collection and the whole pellets were dried in a hot room for two weeks before they were weighed, measured and their prey content analysed.

Most of the mammal remains were identified from the key of skull characters in Southern (1964), using the number and shape of the sacral bones as a further guide. Since most of the mammals had been swallowed whole and the skull was rarely absent, counting the number of skulls was a reliable preliminary estimate of the number of prey items and this was checked against the other bones present. Bird remains were more frequently incomplete, however, and headless or wingless bird corpses were seen at the nest. The bird prey was identified and counted, using all the bones found, by D. Bramwell with the aid of a reference collection of skeletons.

WEIGHT AND SIZE OF PELLETS

The weight and size of the pellets were found to vary considerably. The results of weighing and measuring the total of 220 whole pellets are given in table 1.

Table 1. Analysis of weights and measurements of 220 pellets of Long-eared Owls *Asio otus*, south Lancashire, April-May 1965

	Minimum	Mean	Maximum	Standard deviation
Dry weight	0.77 gm.	1.90 gm.	4.24 gm.	0.59 gm.
Greatest length	2.0 cm.	3.76 cm.	6.0 cm.	0.81 cm.
Greatest breadth	1.4 cm.	2.02 cm.	2.7 cm.	0.26 cm.

PREY CONTENT OF THE PELLETS

A total of 709 prey items was found, 412 of them in the 220 whole pellets and 297 in broken pellets. The number of broken pellets involved was estimated by the formula of Wallace (1948), used also by Armstrong (1958):

FOOD OF LONG-EARED OWLS

$$\frac{\text{No. whole pellets (220)}}{\text{No. animals in whole pellets (412)}} = \frac{\text{No. broken pellets (x)}}{\text{No. animals in broken pellets (297)}}$$

Thus $x = 159$ pellets

With 220 whole pellets and this figure of 159 broken ones, the estimated total was therefore 379 pellets. The mean number of prey items per pellet was 1.9. Of the 220 whole pellets, 31.5% contained one item, 51.8% two items, 12.3% three items and 4.4% four items. Among those in the last category, one contained three Linnets *Acanthis camabina* and a Short-tailed Field Vole *Microtus agrestis*, while two others contained the remains of three mice or voles and one bird.

The analysis of the prey content of the samples is given in table 2. Additional bird species, not listed in table 2, were found dead in the duneland nest. These were Wheatear *Oenanthe oenanthe*, Song Thrush *Turdus philomelos*, Blue Tit *Parus caeruleus* and Coal Tit *P. ater*. Wheat-eaters and Song Thrushes were also found dead in mossland nests.

The Wood Mouse *Apodemus sylvaticus* was the most important rodent and, in the various sites, comprised 46.5% to 64.7% of the total prey. Together, the Wood Mouse, Short-tailed Field Vole and Bank Vole *Melethriomys glareolus* comprised 73.9% to 89.0% of the total prey. The Pygmy Shrew *Sorex minutus*, Brown Rat *Rattus norvegicus* and House Mouse *Mus musculus* formed 4.5% of the mossland prey, but only 0.8% of the duneland prey. A total of 21.0% of the mossland prey was birds, compared with 10.6% of the duneland prey. Significant differences between the duneland winter roost and nest site prey were an increase in the numbers of Wood Mice during nesting and comparable decreases in the numbers of Short-tailed Field Voles and Bank Voles.

The House Sparrow *Passer domesticus* and Skylark *Alanda arvensis* were the commonest bird prey (4.0% and 2.3% respectively) while other species identified were Linnet, Greenfinch *Carduelis chloris*, Starling *Sturnus vulgaris*, Blackbird *Turdus merula*, Goldfinch *Carduelis carduelis*, Chaffinch *Fringilla coelebs*, Redpoll *Acanthis flammea* and Yellowhammer *Emberiza citrinella*.

DISCUSSION

The pellets were similar in size to those measured by Ticehurst (1939), the range being 2.0-6.0 cm. $\times$ 1.4-2.7 cm. (table 1) against his 3.6-5.0 cm. $\times$ 1.9-2.1 cm., but they contained a higher number of prey items per pellet (31.5% with one prey item only, compared with 61.0%). Size variation in pellets of Long-eared Owls may be comparable to that shown by Chitty (1938) to occur in pellets of Short-eared Owls *A. immens* according to the availability of food.

Ticehurst (1939), Zimmermann (1950) and Armstrong (1958) all recorded a predominance of small mammals in the prey of the Long-

Table 2. Prey found in the pellets of Long-eared Owls *Asio otus*, south Lancashire, April-May 1965

The occurrence of each prey species is expressed as a percentage of the grand total with the number of prey items, from which the percentage is calculated, given in brackets

Species	Coastal dune pine forest			Total	Six mossland nest sites	Combined results
	Winter roost	Nest				
Wood Mouse <i>Apodemus sylvaticus</i>	50.8% (161)	64.7% (136)		56.3% (297)	46.5% (85)	54.0% (382)
Short-tailed Field Vole <i>Microtus agrestis</i>	23.4% (74)	17.6% (37)		21.1% (111)	23.6% (43)	21.8% (154)
Bank Vole <i>Clethrionomys glareolus</i>	13.9% (44)	6.7% (14)		11.0% (58)	3.8% (7)	9.2% (65)
Pygmy Shrew <i>Sorex minutus</i>	0.6% (2)	—		0.4% (2)	2.8% (5)	1.0% (7)
Brown Rat <i>Rattus norvegicus</i>	0.6% (2)	—		0.4% (2)	1.1% (2)	0.6% (4)
House Mouse <i>Mus musculus</i>	—	—		—	0.6% (1)	0.1% (1)
Indeterminate	—	—		—	0.6% (1)	0.1% (1)
TOTAL MAMMALS	89.3% (283)	89.0% (187)		89.2% (470)	79.0% (144)	86.6% (614)
House Sparrow <i>Passer domesticus</i>	2.9% (9)	2.8% (6)		2.9% (15)	7.1% (13)	4.0% (28)
Skylark <i>Alauda arvensis</i>	1.9% (6)	1.0% (2)		1.5% (8)	4.4% (8)	2.3% (16)
Linnet <i>Acanthis cannabina</i>	1.9% (6)	0.5% (1)		1.3% (7)	1.7% (3)	1.4% (10)
Greenfinch <i>Carduelis chloris</i>	0.9% (3)	1.4% (3)		1.1% (6)	1.7% (3)	1.3% (9)
Starling <i>Sturnus vulgaris</i>	0.9% (3)	0.5% (1)		0.8% (4)	1.1% (2)	0.8% (6)
Blackbird <i>Turdus merula</i>	0.6% (2)	—		0.4% (2)	—	0.3% (2)
Goldfinch <i>Carduelis carduelis</i>	0.3% (1)	0.5% (1)		0.4% (2)	—	0.3% (2)
Chaffinch <i>Fringilla coelebs</i>	—	0.5% (1)		0.2% (1)	—	0.1% (1)
Redpoll <i>Acanthis flammea</i>	—	0.5% (1)		0.2% (1)	—	0.1% (1)
Yellowhammer <i>Emberiza citrinella</i>	—	—		—	0.6% (1)	0.1% (1)
Indeterminate	1.3% (4)	2.8% (6)		1.8% (10)	4.4% (8)	2.5% (18)
TOTAL BIRDS	10.7% (34)	10.5% (22)		10.6% (56)	21.0% (38)	13.2% (94)
INSECTS (indeterminate)	—	0.5% (1)		0.2% (1)	—	0.1% (1)
GRAND TOTALS	100% (317)	100% (210)		100% (527)	100% (182)	100% (709)

Long-eared Owl. Ticehurst (1939) found that mammals formed 80.1% of the prey in pellets from Kent, Norfolk, Cambridgeshire, Yorkshire and Lancashire, including 36.0% Short-tailed Field Voles and 32.5% Wood Mice; Zimmermann (1950) showed that the mammal prey of a breeding pair near Potsdam, Germany, fluctuated between 65.6% and 99.5% of the total during the years 1947-50; and Armstrong (1958) found that in Michigan 95% of the prey was mice, particularly *Microtus pennsylvanicus* (70.6%).

Although the present study was conducted over a short period of time, the abundance of mice and voles recorded (86.6%) is thus in agreement with the results obtained in other parts of the species' range. It is clear that the prey of the Long-eared Owl varies with season and locality, but the mammal content is apparently never less than 65% of the whole and is most commonly 80% or more.

ACKNOWLEDGEMENTS

I am grateful to the Merseyside Ringing Group who located most of the nest sites and helped to collect the pellet samples. D. Bramwell identified the bird remains, C. Felton gave additional information about the birds in the duneland area, and Eric Hardy helped with the literature. I am also indebted to the landowners in south Lancashire who co-operated in the work.

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Notes

Numbers of Capercaillie in the Black Wood of Rannoch.—The Black Wood of Rannoch, in Perthshire, is regarded as one of the finest remnants of the Caledonian pine forest in Scotland. Capercaillie *Tetrao urogallus* were counted on approximately 920 acres (372 hectares) of this wood on 21st March and 24th November 1965, and 27th March 1966. The area was driven from east to west by a line of some 30 beaters spaced about 50 metres apart, with nine to eleven observers stationed at vantage points around the south and west edges of the wood. A watch was also kept for birds flying out over Loch Rannoch, which forms the northern boundary of the area studied. The beaters counted all Capercaillie flying back over their heads on to the area already driven, and the stationary observers counted those which flew past them out of the wood. In this way every bird should have been counted once only. The results of the counts were as follows:

	March 1965	November 1965	March 1966
Males	14	22	19
Females	19	18	14
Sex not determined	30	12	38
TOTALS	63	52	71
Acres per bird	16	18	13
Hectares per bird	6	7	5

Owing to the nature of the terrain and the shape of the wood, however, some beaters occasionally became disorientated. As a result, in each count small parts of the wood were not covered adequately and the figures above are therefore considered minimal.

The close agreement between the totals, despite this potential error, suggests that:

- (1) the breeding production was low in 1965, a suggestion supported by an analysis of age classes of Capercaillie killed by sportsmen in north-east Scotland during the winter of 1965/66 (25 juveniles out of 117 birds examined);
- (2) the 1966 spring population remained at a level similar to that in 1965 even though production was apparently poor in 1965.

The totals indicate a population density of about one Capercaillie per 15 acres (6 hectares). In terms of biomass, this is equivalent to a population density of Red Grouse *Lagopus lagopus scoticus* of about one bird per 3 acres (1¼ hectares). The sex ratios obtained do not differ significantly from a 1:1 ratio for any count ($p > 0.05$) and this agrees with data from other field studies of Capercaillie in north-east Scotland.

We greatly appreciate the help of the boys of Rannoch School and the many others who took part in the counts, and we are grateful to the Forestry Commission for permission to work in the Black Wood.

G. W. JOHNSTONE and FRED C. ZWICKEL

Swallow with deformed bill.—On 23rd August 1965, at a roost of about 400 Swallows *Hirundo rustica* in reeds bordering Corsham Lake, Wiltshire, we trapped and ringed an adult female with a deformed bill. The upper mandible was downcurved two millimetres to the right over the lower mandible which appeared normal. The length of the bill was 13 mm. from the skull, *The Handbook* giving a maximum of 12 mm. In his paper on 'Birds with abnormal bills' (*Brit. Birds*, 55: 49-72), D.F. Pomeroy quoted a case of lateral curvature in a Swallow whose whole bill was turned to the right, but we can find no previous record of crossed mandibles in this species. The bird's weight of 19.75 grams at 21.20 hours GMT was actually fractionally heavier than the average of 19.60 grams for the 15 other Swallows trapped that evening.

RODERICK C. FAULKNER and JULIAN C. ROLLS

[Although bill deformities of this kind have been recorded for a wide variety of species and many individuals seem to thrive in spite of them, we think it of interest that this aerial insect-eater, which needs a wide open gape to catch its prey, should survive so well.—Eds.]

House Martins and Sand Martins apparently feeding from ground.—In connection with Mrs. E. M. Trevor's note on House Martins *Delichon urbica* apparently taking insects on the ground (*Brit. Birds*, 58: 511), it may be of interest that early in the morning on 14th August 1966, on some playing fields at East Molesey, Surrey, I saw a flock of about 200 Sand Martins *Riparia riparia* and 50 House Martins pecking at the close-mown turf. At any one time about 200 of them would be on the grass and the rest fluttering low overhead. I took it that they were pecking at insects, but I was unable to inspect the actual area. The weather was sunny with a light westerly wind and when I returned half an hour later nearly all the birds had gone. According to James Fisher (1955, *Bird Recognition*, 3: 148), House Martins occasionally feed in this way and I have myself seen small numbers of this species and Swallows *Hirundo rustica* apparently feeding in the same playing fields, but never before Sand Martins or such a large concentration of birds.

P. J. OLIVER

[As it was early morning, the possibility that the martins were taking drops of dew should perhaps not be overlooked.—Eds.]

Carrion Crow carrying off nestling Woodpigeon.—Early on the morning of 15th April 1966 I disturbed a Carrion Crow *Corvus corone*

from one of the roadside trees in an avenue in Southbourne, Bournemouth, Hampshire. It flew across in front of me carrying a large object which it dropped in the middle of the road. I had the impression that it was holding the object in its talons and not in its bill, but the view was so brief that I could not be sure of this. At any rate, the object proved to be a well-grown young Woodpigeon *Columba palumbus* with its body plumage in pin and its wing and tail feathers already emerging. It was still alive and apparently uninjured apart from minor skin damage on its back and a broken edge to its upper mandible, but it died the following night. C. I. HUSBAND

[Carrion Crows frequently take the eggs of Woodpigeons, but we know of no record of their taking young Woodpigeons of any size and this is confirmed by Dr. R. K. Murton, author of *The Wood-Pigeon* (1965). Dr. Murton adds that, once hatched, nestling Woodpigeons suffer relatively little predation, partly, he suspects, because they have a very marked aggressive posture which must intimidate potential enemies. It is unfortunate that Mr. Husband could not be certain that the Carrion Crow was carrying the young Woodpigeon in its feet, for, although there are records of both this species and the Common Crow *Corvus brachyrhynchos* of America seizing animal prey in the feet, it is more usual even for large food items to be carried in the beak.—EDS.]

Redwings breeding in Sutherland.—On 28th May 1966, in north Sutherland, I heard the alarm notes of two adult Redwings *Turdus iliacus* in a mixed wood of birch and conifers with an undergrowth of rhododendrons. In one of the rhododendrons I found a nest with young three or four days old. This was about 4 feet 6 inches from the ground and was a bulky affair made entirely of dry grass with a deep cup lined with a little earth and grass. Later both adults were watched feeding the young and one was seen brooding them on the mornings of 29th and 30th May. The young left the nest on 5th or 6th June.

The birds were seen by many people and identification was confirmed by Mrs. P. V. Upton, Lt.-Colonel J. K. Stanford, J. G. Cook, R. Cook and F. J. L. Munro. They were paler on the upper-parts than those I found breeding in Ross-shire in 1959 and 1960 (*Brit. Birds*, 52: 315; 53: 358-359), being very little darker than a Song Thrush *T. philomelos*, and the superciliary was less prominent, but it is impossible to say with any certainty that they were of the typical rather than the Icelandic race.

The young and adults were seen together as a party on 13th June. That day I also heard song for the first time, while a Blackcap *Sylvia atricapilla* and a Chiffchaff *Phylloscopus collybita* near-by completed an unusual trio of songsters for Sutherland. E. G. HOLT

[There can be little doubt that Redwings now breed every year in Scotland, but we are publishing this note for two reasons. First, the

locality is one in which nesting has not previously been recorded. Secondly, it gives us an opportunity to publish a brief summary of what is known about the breeding of Redwings in the British Isles. In this connection, we are grateful to J. L. F. Parslow and Dr. Ian D.ennie for providing various references and other data. In Sutherland Redwings nested in 1925, probably 1927, 1933 and 1941 (*Brit. Birds*, 40: 27-278), and singing birds were recorded in several other years; after the war there were up to three nests in one part of south-east Sutherland in 1955 and 1957-59 and doubtless the intervening year as well (*Scot. Birds*, 1: 190-191) and a pair bred in west Sutherland in 1964 (*Scot. Birds*, 3: 315). In Ross-shire the breeding by two or three pairs in 1959-60 is referred to by Mr. Holt in his note above and nesting was proved again in that county in 1961 and 1963 (*Scot. Birds*, 1: 454-455; 4441). Otherwise, the species nested in Morayshire in 1932-33 (*Brit. Birds*, 26: 132; 27: 51); in Inverness-shire in 1936 and 1955; and in Orkney, on Fair Isle and Unst respectively, in 1935 (*Scot. Nat.*, 1936: 193) and 1953-54 (L. S. V. and U. M. Venables, 1955, *Birds and Mammals of Scotland*); while in Ireland a pair attempted to breed in Co. Kerry in 1961 (R. F. Ruttledge, 1966, *Ireland's Birds*). There are probably unpublished records from other parts of the Highlands.—Eds.]

Nocturnal singing and feeding by Robins in winter.—On many occasions in December 1965 and early January 1966, at Saltford, Somerset, I heard two Robins *Erithacus rubecula* singing regularly for long periods after dusk. They held adjacent territories with a metalled road intervening and it seemed that the amber street lighting stimulated the nocturnal behaviour, as they used to continue until the lighting was extinguished at about midnight. The singing was more sustained during mild and rainy weather. Observation showed that both Robins also spent some time on the ground in search of food. In fact, I found them taking small surface-feeding worms which they broke into small pieces and then swallowed; in addition, they obtained small winged insects in areas of lush grass.

Dr. David Lack informs me that, although it is not uncommon for Robins to sing at night, he has not previously heard of an instance involving two individuals and he knows of no previous record of Robins feeding after dark.

BERNARD KING

It is certainly not unusual for Robins and also Dunnocks *Prunella vulgaris* to sing by the artificial light of street lamps and the note which follows shows that the number need not even be limited to two. What seems much more interesting is the fact that they were also singing. Perhaps even this is not unexpected, however, as birds are opportunists and in southern Europe and Africa such insectivorous species as Swallows *Hirundo rustica* and Lesser Kestrels *Falco naumanni* feed after dark on the insects attracted by artificial lighting.—Eds.]

At about 11.15 p.m. on 18th January 1962, along the main Old Woking Road at West Byfleet, Surrey, I heard no less than three Robins singing from garden shrubberies in a stretch of 70 yards. Two of them appeared to be counter-singing in that one would utter a short burst and, after a brief pause, the other would then respond. The third was singing rather more intermittently, but all three continued throughout the few minutes I was there.

The area was well illuminated by strip lights 40 yards apart and, in addition, the moon was high in the sky and only two days off full.

P. A. D. HOLLAM

Blackcap imitating Willow Warbler's song.—With reference to the recent note by Rev. G. W. H. Moule (*Brit. Birds*, 59: 198), the German ornithological literature contains many references to Blackcaps *Sylvia atricapilla* mimicking other birds, but I can find no mention of the song of the Willow Warbler *Phylloscopus trochilus* among these imitations. On 10th June 1965, however, I heard the excited call-notes of a *Sylvia* at Garmisch-Partenkirchen, in south Bavaria. A few minutes later the song of a Willow Warbler came twice from the same spot and was immediately followed by the song of a Blackcap. The intensity and tone colour of the two songs were similar and it was obvious that they came from the same bird which I was afterwards able to see was a male Blackcap. Two days later, about 24 kilometres to the north, in the Murnauer Moos, I again heard a male Blackcap which among several normal songs uttered a full imitation of a Willow Warbler. In each case the imitation was louder and harder than the original. It should be added that Willow Warblers are common breeding birds in both these localities.

E. BEZZEL

From 24th April to 5th May 1964 a Blackcap in Regent's Park, London, regularly included a good imitation of a Willow Warbler in his song. So far as I can recall, the Willow Warbler phrase always closely followed, or was followed by, a normal Blackcap one. D. I. M. Wallace also heard this bird on a number of occasions and likened the imitation to a contralto Willow Warbler.

R. H. KETTLE

On 2nd May 1966 a pair of Blackcaps were building a nest in brambles only about twelve feet from the windows of our house at Guildford, Surrey, and the male was singing loudly. On 6th May I realised that the same male was also responsible for the single phrases which I had thought were produced by an elusive Willow Warbler. This became obvious when I saw him singing a combination of both songs, but he often sang only the Willow Warbler phrase. He continued to utter this song in June after the first brood had been raised. There were no Willow Warblers singing in or near the garden during the whole period.

D. J. BULLOCK

Persistent attacks by female House Sparrow on her own reflection.

—In February 1964 a female House Sparrow *Passer domesticus* began to attack her reflection in a north-west window of a bungalow owned by D. Cousins at Brentry, Bristol, and what was apparently the same bird continued to do this daily until June 1966, when the attacks ceased abruptly.

The attacks used to start when the curtains of the room were drawn back at about 8 a.m. and lasted up to 45 minutes; the process was often repeated two or three times in the course of the day. The House Sparrow would alight on the sill, then flutter up the pane pecking at and tapping the glass, until eventually she would suddenly fly off. Crossed strands of black cotton in front of the window failed to deter her and the wooden window frame became so marked that a new one had to be ordered.

A. P. RADFORD

[Records of birds attacking their reflections in windows, mirrors and shiny metal surfaces are legion and it is not unusual for such attacks to be repeated over long periods. For example, Dr. J. S. Ash tells us that a male Chaffinch *Fringilla coelebs* has attacked a north window of his house at Fordingbridge, Hampshire, for two successive years and at times has spent most of the day doing this until the glass and paintwork have become completely fouled. On the other hand, it is a habit which is mainly confined to males and, considering that many House Sparrows live in a world of glass windows, it is surprising that such behaviour is not more often recorded. In fact, it is interesting that only a tiny minority of this or any other species seems to behave in this way. We showed Dr. Radford's note to Dr. J. D. Summers-Smith, author of *The House Sparrow* (1963), and he has kindly provided the following comment.—Eds.]

Cases of House Sparrows pecking at their reflections in window panes are by no means uncommon. W. Muir (1923, *Nature*, 111: 681) recorded a male that kept this behaviour up for two years, sometimes for hours at a time. Other published observations include those by K. J. Britten (1944, *Nature*, 153: 559-560) and L. W. Grenstead (1950, *Countryman*, 41: 177-178). Most records involve males, but J. Withinshaw (1948, *Countryman*, 37: 265) described how a young bird persistently threw itself against a window and in 29 minutes of observation over three days he saw it do so no less than 1,188 times. The common feature is that one particular window receives attention. The fact that a female was involved in the case described by Dr. Radford is interesting, but not unexpected as territorial fights in this species are always between members of the same sex and often involve females.

J. D. SUMMERS-SMITH

Reviews

Population Studies of Birds. By David Lack. Clarendon Press, Oxford, 1966. 341 pages; 1 photographic plate; many text-figures. 63s.

Dr. Lack's first book on animal populations, *The Natural Regulation of Animal Numbers* (1954), embraced all animals, but most of the detailed studies he dealt with were of birds, primarily because birds had been more studied than other groups. It has had a great influence on our thinking about animal populations; also, of course, it has had its critics. Meanwhile, in the twelve years since it was published, much new work on animal populations, and especially bird populations, has been carried out, which makes it possible to test more critically some of the conclusions of the earlier book. Accordingly, Dr. Lack has followed it up with this sequel, in which he concentrates entirely on birds.

The main part of the book is devoted to 13 species, the criteria for their inclusion being that they should have been studied for at least four years and that the study should have consisted of a good deal more than just an annual census. In addition, a number of lesser studies of other species have been included, if they show important parallels to the main species or bring out additional points. It is perhaps of interest that, although the criteria for inclusion were applied impartially, nine of the 13 main studies were of British birds in Britain (two of them were studied outside Britain as well). None of them was from the U.S.A., in spite of the great number of professional ornithologists there, and this seems to be due, at least in part, to the fact that the pressure to produce 'results' militates against long-term field studies.

A chapter is devoted to each of the main species, except that the Great Tit, which has been studied in great detail by Dr. Lack's research team, is given three chapters. The other twelve are as follows: Coal Tit (Breckland plantations), Pied Flycatcher (Forest of Dean, also elsewhere), Blackbird (Oxford), Tawny Owl (near Oxford), Wood-pigeon (Cambridgeshire), Kittiwake (Northumberland), Red Grouse (Scotland), Manx and other shearwaters (Skokholm and Australia), Quelea (tropical Africa), Black and White Manakin (Trinidad), White Stork (central Europe) and Yellow-eyed Penguin (New Zealand). In each chapter the main findings of the study are described and critically assessed. In some cases Dr. Lack gives his own interpretation, differing from that of the author, but this is always made clear.

In the course of these chapters a certain number of points come out which lead Dr. Lack to modify the conclusions of his earlier book. The most important of these is perhaps that in a number of species there is evidence, direct in the case of the Great Tit and Bullfinch (one of the 'minor' species) and indirect in the others, that the start of the

breeding season is determined by the ability of the female to obtain enough food to produce her clutch, and that if it were possible to lay earlier it would be advantageous to do so. Thus the breeding season is not timed in such a way that the young are in the nest when food for them is most abundant. This finding does not, however, affect the validity of Dr. Lack's main thesis with respect to reproductive rates, that they have evolved through natural selection favouring those individuals that contribute most to subsequent generations.

Indeed, the further studies dealt with in this book confirm the main conclusions of the earlier one. In a nutshell, these are that reproductive rates are as rapid as the environment and the birds' capacities allow; that mortality rates balance, i.e. are a consequence of, reproductive rates, and not vice versa; that most populations are controlled by density-dependent mortality operating outside the breeding season; and that territorial behaviour disperses birds in relation to the food supply, but does not usually set a limit to overall density.

Controversy is always stimulating, and these views have aroused some controversy. But it is valuable, too, in leading to further efforts to discover the truth. For ornithologists this particular controversy should be of especial interest, since much of the evidence is derived from birds and since it is almost entirely non-technical and concerns a problem—population control—of vital importance to mankind. At the end of the book, after a concluding chapter drawing together the results of the 20-odd studies reviewed, Dr. Lack deals in an appendix with two recent books which take very different views from his own about the control of animal populations. In the same year as *The Natural Regulation of Animal Numbers*, H. G. Andrewartha and L. C. Birch published a large book on *The Distribution and Abundance of Animals*. In this, which deals mainly with insect populations, the authors sought to show that density-dependent control is an unjustified and unnecessary concept, and that animal populations are held in check by the shortage, or inaccessibility, of the various material resources needed by the animals, combined with a shortage of time when conditions are favourable for population increase. It would lie outside the scope of this review to go into the arguments and evidence against Drs. Andrewartha and Birch's views, and it must suffice to say that not only Dr. Lack but other ecologists have shown that they failed to distinguish between the causes of annual or periodic fluctuations and the reason why these fluctuations are maintained about a certain mean level.

More topical are the views recently advanced by Professor Wynne-Edwards in *Animal Dispersion in Relation to Social Behaviour* (1962). Here the cleavage of opinion is fundamental. Wynne-Edwards argued that availability of food sets an ultimate limit to the numbers of an animal, but that this limit is not normally reached: instead, the repro-

ductive rate is adjusted to balance mortality and to maintain the population below the level at which it would over-exploit the food supply. In support of this, he interpreted many aspects of the breeding biology of birds as 'homeostatic' mechanisms serving to reduce fecundity to the level needed to maintain numbers stable at the optimum level. Again, in a short review it is impossible to do justice to the arguments on each side. Dr. Lack devotes twelve pages of the appendix to refuting Wynne-Edwards's thesis, in addition to passing references in the main chapters of the book. Certainly there are several controversial points where, in the absence of adequate evidence, there is room for more than one opinion; but Dr. Lack's hypothesis, which is logically unassailable and backed by a great deal of evidence, seems likely to prevail. Surprisingly, there is still no proof of the operation of density-dependent mortality in any bird species, and this is fundamental to the hypothesis. Or perhaps it is not surprising, as density-dependent mortality is bound to be difficult to demonstrate. To do it, one would not only have to measure the population level and the mortality each year, but would have to continue the study over many years, so that the varying effects of weather and other environmental factors could be eliminated. Meanwhile, density-dependent mortality is a logical deduction, but, as Dr. Lack points out, none the worse for that, since natural selection itself was no more than that for nearly 100 years after the *Origin of Species* was published.

It is pleasant that a book of serious biological intent should also be a delight to look at. To bring the birds discussed more vividly to mind, there are head- and tail-pieces to the chapters, and occasional drawings in the text, by Robert Gillmor. When our heads are over-full with mean clutch-sizes, mean weights, percentages hatched, and juvenile: adult ratios, these admirable drawings remind us that we are dealing with living creatures, and this was surely part of the intention.

D. W. SNOW

The Reader's Digest Complete Atlas of the British Isles. Reader's Digest Association, London, 1965. 230 pages. £5 10s.

This considerable volume, measuring $15\frac{1}{2}$ by $10\frac{3}{4}$ inches and with 230 pages, is entirely devoted to a single group of islands in western Europe of little more than 120,000 square miles in extent. It is thus far more than an atlas in the conventional sense, though there are 45 pages of detailed maps at six miles to the inch based on the Ordnance Survey, supplemented by 14 pages showing vividly on a smaller scale the relief and main types of land use. The remaining three-quarters of the work is more unusual, part atlas, part gazetteer and part encyclopaedia, giving in maps, diagrams and text an astonishing amount of information on almost every conceivable aspect of these islands—geology, climate, history, communications, agriculture, commerce,

industry, population, government, religion, place names, dialects and so on. The naturalist is well catered for with sections on mammals, reptiles and amphibians, birds, plants, and fishes, both freshwater and marine. These are quite full: the section on birds includes maps showing the main patterns of migration each month in the British Isles, a global map of the journeys of the birds which visit us and two pages describing some eighty species in different habitats in Britain, illustrated with black-and-white sketches and maps showing their breeding distribution. These maps are not as detailed as those dealing with mammals and some others, but this is the fault not of the compilers but of us ornithologists who so far have shirked the admittedly difficult task of mapping our birds as fully as, for example, the plants have been done by the botanists. Even so, the map for the Black Redstart suggests it is far more widely distributed than is the case, while that of the Peregrine, in contrast, surely paints too gloomy a picture.

This atlas is a stimulating book for any inhabitant of these islands, whatever his interests—colourful, well-produced and showing great genuinity in presenting an enormous and varied mass of information. Naturalists in particular can, with its aid, ponder the influences of climate, geology, vegetation and other factors on the distribution of different species, though a detailed map of the different types of woodlands is lacking. My only other complaint is against the tendency to pack too much on a page, sometimes making it difficult to appreciate fully the information presented.

STANLEY CRAMP

ALSO RECEIVED

- Animal Affinities with Man.* By Thurlow Craig. Country Life, London, 1966. 30s.
Birds in Colour. By Bruce Campbell. Revised edition. Blandford, London. 21s.
and Watching. By Peter Clarke. Newnes, London, 1965. 10s. 6d.
Five New Victuals. By Elspeth Huxley. Chatto and Windus, London, 1965. 21s.
Pararies, Budgetrigars and other Cage Birds. By W. J. Page. Newnes, London, 1966. 10s. 6d.
Vogelwelt Lettlands. By N. v. Transehe. Verlag Harro von Hirschheydt, Hannover, 1965. DM 18.0.
Fourth American Birds Eggs. By Chester A. Reed. Revised edition by Paul A. Bickley. Dover Publications, New York, 1965. \$3.00.
Preys in Speyside. By George Waterston. R.S.P.B., Sandy, 1966. 5s.
Reader's Digest/A.A. Book of the Road. 1966. Reader's Digest and Automobile Association, London, 1966. 63s. (48s. 6d. to members).
Geneti Shall Not Die. By Bernhard and Michael Grzimek. Reprinted. Collins, London, 1965. 25s.
Living Birds. By J. S. Duriš and Edmund Burke. Paul Hamlyn, London, 1964. 10s. 6d.
Bird Table Book. By Tony Soper. David & Charles, Dawlish; Macdonald, London, 1965. 21s.
Birds of Shakespeare. By James E. Harting. Reprinted. Argonaut, Chicago, 1965. \$7.50.

- The Golden Eagle.* By Robert Murphy. Cassell, London, 1966. 25s.
The Migration of Birds. By James Fisher. Bodley Head, London, 1966. 13s. 6d.
The Owl Family. By Frank Wenzel. Allen & Unwin, London, 1966. 35s.
Wind in the Reeds. By Philip Wayre. Collins, London, 1965. 30s.

Letters

Fault-bars as a means of ageing birds

Sirs,—Last year I read a letter by C. J. Mead on the ageing of birds by means of fault-bars (*Brit. Birds*, 58: 227-228), in which he referred to the work of W. E. Glegg who noted fault-bars on the tails of 737 bird skins (*Ibis*, 86: 511-516). But Glegg, who probably did more work on fault-bars than anyone else in this country, was unable to find any correlation between these bars and age. Indeed, he stated this in the closing paragraph of his paper: 'The results of the enquiry suggest that subordinate barring is a character common to birds, and it cannot be said to depend on sex, age, colour, locality or season for its appearance. It is shown to be a very variable character. As to what part it plays in the economy of the bird's life cannot even be guessed at. Some approach, however, may be made as to its nature. The subordinate barring is probably due to structural modification of the feathers in the same way as some colours are produced by structural adaptation of the feathers. The fact that it is found freely in birds which are normally white, and more especially in feathers which are white as a result of albinism, discountenances the probability of the bars arising from pigment. A microscopical examination or chemical test would be necessary to prove the cause of subordinate barring.'

I examined a large number of bird skins with the intention of either proving or disproving Mead's findings. The results of hundreds of observations were such as totally to invalidate his theory and I am in complete agreement with Glegg's conclusions.

Since Blue Tits *Parus caeruleus* were specifically mentioned in Mead's letter, I examined a series of 50 skins of this species and recorded the

Table 1. Relative positions of fault-bars on the tails of Blue Tits *Parus caeruleus*
 Colour of primary coverts was used to separate adults (blue) and first-year birds (green)

Adult		First-year	
Bars in bands	Not in bands	Bars in bands	Not in bands
22	3	23	2
88%	12%	92%	8%

LETTERS

Table 2. Relative positions of fault-bars on the tails of 32 adult warblers taken at random

	Bars in bands	Not in bands
Great Reed Warbler <i>Acrocephalus arundinaceus</i>	1 (50%)	1 (50%)
Reed Warbler <i>Acrocephalus scirpaceus</i>	2 (100%)	0 (0%)
Marsh Warbler <i>Acrocephalus palustris</i>	2 (100%)	0 (0%)
Sedge Warbler <i>Acrocephalus schoenobaenus</i>	4 (100%)	0 (0%)
Blackcap <i>Sylvia atricapilla</i>	2 (100%)	0 (0%)
Whitethroat <i>Sylvia communis</i>	1 (50%)	1 (50%)
Lesser Whitethroat <i>Sylvia curruca</i>	3 (100%)	0 (0%)
Willow Warbler <i>Phylloscopus trochilus</i>	8 (80%)	2 (20%)
Chiffchaff <i>Phylloscopus collybita</i>	4 (80%)	1 (20%)
TOTAL	27 (84.4%)	5 (15.6%)

fault-barring on their tails (table 1). Notes were also made on the fault-barring on the tails of 32 adult warbler skins taken at random (table 2); this series was examined because the tail coloration of most warblers is such that the fault-barring shows up remarkably well. In the compilation of the tables, I have not included birds in any of the following categories: (1) those which showed any sign of tail moult, or had any tail feathers missing; (2) those in which the bands did not extend the full way across the tail; and (3) those which showed any marked unevenness in the width or colour of the fault-bars in the same band.

It will be seen that 48% of the birds in table 1 and 84.4% of those in table 2 failed to comply with Mead's findings which are thus, of course, completely invalidated. Further, although I have used the term 'fault-bar' throughout this letter to avoid confusion, I consider it to be erroneous; the term 'subordinate bar', as used by Glegg, is much to be preferred since these markings are not caused by faults.

I should like to take this opportunity of thanking R. Wagstaffe, Keeper of Vertebrate Zoology at the Liverpool City Museums, for permitting me to use the study collection there; also A. Jones and J. Ellis for their useful comments and criticisms.

B. THURSTON

[We showed Mr. Thurston's letter to C. J. Mead and his reply is printed below.—EDS.]

...rs,—I have read Mr. Thurston's letter with interest. The passage he quotes from W. E. Glegg's paper in *Ibis* must have been written without knowledge of the other two publications, by Dr. Oscar Riddle (1908, *Biol. Bull.*, 14: 328-370) and H. and J. R. Michenor (1938, *Condor*, 40: 149-160), to which I referred in my previous letter. I am sure that Glegg would not have written as he did if he had seen these two papers.

Indeed, Glegg (*Ibis*, 87: 471-473) afterwards acknowledged a letter from W. L. McAtee (*Ibis*, 87: 289) drawing his attention to Riddle's work. The first shows that fault-bars occur in that part of the feather which grows during the later part of the night at a time of lowered metabolic rate or decreased blood-pressure. The second, using data from many thousands of observations of House Finches *Carpodacus mexicanus* from which feathers had been plucked, also demonstrated that the bars were present in the vanes before they had broken out of sheath and were not caused by some factor acting on the fully grown feather.

The Michenors also commented on the very marked bars found on some juveniles: 'It is only on birds in juvenal plumage, all the feathers of which grew at substantially the same time, that the *bands* are found to extend across all the flight feathers of the wings or tail, with the possible exception of a bird of any age which has simultaneously lost and replaced all the feathers of a tail, for instance, and, during the growth of the replacement feathers, has experienced some condition which caused the *bands* to form. Any feathers of postjuvenal or later plumages may have these *bands* on individual feathers, but the *bands* will not line up as a band across several adjacent feathers unless those feathers grew simultaneously.' My italics show where the Michenors used 'bands' to mean especially marked fault-bars.

It follows that even a slight discontinuity in the pattern of bars, which is present in the same place on all the tail-feathers, must indicate that the whole tail was grown at the same time. Figs. 41e, 41f and 42a in the Michenors' paper show this very well; their description of the bars is 'similar in appearance to a watermark on paper'. It is unfortunate that Mr. Thurston has excluded from his tables all birds in his categories (2) and (3), for these should have been included in 'Bars not in bands': I am certain that several of his random adult warblers will have been individuals with their juvenile tail-feathers retained in their first breeding season (for instance, the Chiffchaffs *Phylloscopus collybita*). I find it impossible to reconcile his observations with what is known of this phenomenon and can only conclude that he has not been critical enough in his examination of the bars he observed.

I would prefer this phenomenon to be called 'starvation marks' or 'hunger traces' when applied to the very marked bars attributable to this cause in juveniles. Nevertheless, the term 'fault-bars', which correctly implies a physical deficiency in the feather, is undoubtedly preferable to 'subordinate bars' or any other term to cover the bars which Glegg found on all his specimens.

I have used this character to supplement conventional ageing techniques on a large number of birds caught for ringing and on the British Trust for Ornithology's small collection of wings and tails. Even given ideal conditions, between 10% and 15% of all tails examined were indeterminate; where generally accepted characters for

geing were available, the fault-bars agreed with them. In other species (for instance, Cetti's Warbler *Cettia cetti*) where no character for geing has been published, many individuals may confidently be determined as juveniles on the presence of bands of bars on tails in fresh plumage.

C. J. MEAD

News and comment

Edited by J. L. F. Parslow

World conference of the I.C.B.P.—The 14th world conference of the International Council for Bird Preservation, held in Cambridge from 11th to 15th July 1966, was attended by representatives from 31 different countries. A wide range of topics were discussed, including the effects on bird-life of agricultural toxic chemicals, pollution of rivers and inland waters, and oil pollution of the sea. It was announced that with the recent acceptance by Iceland of the 1962 amendments to the 1954 Convention for the Prevention of Pollution of the Sea by Oil, the required number of accepting countries had been reached to bring these amendments into force. They will come into effect on 18th May 1967 and will make more effective the provisions of the Convention aimed at the reduction of pollution of the sea. However, there are still a number of leading maritime nations which have not even adhered to the Convention. A resolution was passed reiterating that the ultimate aim should be total prohibition of the discharge of oil into the sea. This resolution was later supported by the Advisory Committee on Oil Pollution of the Sea at its meeting under the chairmanship of Earl Jellicoe on 25th October. The I.C.B.P. conference also decided that an approach should be made to the Inter-Governmental Maritime Organisation to consider the possibility that an international fund and agreement might be established for the means of dealing promptly with oil disasters caused by accidents to tankers.

Differing views were put at the conference on the question of the artificial re-introduction of indigenous species to places where they had been extirpated by man, and it was eventually left to the national sections to give advice, and if necessary intervene, when confronted with the question in their own countries. A working committee was set up to look into the possibilities of improving the 1950 International Convention for the Protection of Birds, with a view to enabling those countries which have been prevented for various reasons from ratifying the Convention to do so.

S.P.B.'s new chairman.—Stanley Cramp, senior editor of *British Birds*, was elected chairman of the council of the Royal Society for the Protection of Birds at its annual general meeting in London on 5th October. The retiring chairman, the Rev. P. H. T. Hartley, had held the office for the last five years, throughout which period the society's membership and activities have grown quite remarkably.

Ornithological information required from Greece.—A group of six German ornithologists is currently preparing the chapter on birds for the *Catalogus Faunae Graeciae*, edited by Professor Dr. A. Kanellis of the University of Thessaloniki, as well as a book dealing with the birds of Greece and the Aegean Islands, including Crete. They would be grateful if any British ornithologist having unpublished field notes on the birds of Greece would write to W. Bauer, Seckbacher Landstrasse 43, D-6500 Kurfürst/Main, Germany.

Nest-boxes, 'pop' and traditional.—There is something oddly disturbing about this photograph of a nest-box now being put on the market by Moorfield Products,



of 1 Highfield Road, Moordown, Bournemouth. An accompanying hand-out, beyond describing it as 'attractive' and adding that it sells for 35s., gives no clue as to the reason for its strange, futuristic shape, which seems more to resemble the objects intended to be deposited therein than a nest-box. It is said to have been 'specially designed', though by whom is something we are left to guess.

Meanwhile, the less affluent traditionalist can continue to obtain the ready-made and well-tried wooden boxes sold by the Royal Society for the Protection of Birds at about half the price. This body has also just published a leaflet for school-children which gives details of a do-it-yourself wooden nest-box. The instructions are easy to follow and the cost of materials has been kept to a minimum. The leaflet will be sent free to school-teachers or children sending a stamped addressed envelope to the R.S.P.B., The Lodge, Sandy, Bedfordshire.

International game biology congress.—The 8th International Congress of Game Biologists will be held in Helsinki, Finland, from 22nd to 27th August 1967. It is open mainly to those doing research in the fields of game biology or wildlife management. The programme will include symposia on 'Aims and methods of waterfowl research', 'Population ecology of tetraonid birds' and 'Use of voluntary help from sportsmen and other amateurs for research purposes'. Excursions to northern Finland and to the main habitat types in the south of the country are planned for the three to four days immediately before and after the congress. Enquiries should be made to the general secretary of the congress, Dr. Matti Helminen, State Game Research Institute, Unioninkatu 45 B, Helsinki 17.

New features at the London Zoo.—There has recently been a marked and welcome improvement in the labelling of the aviaries at the London Zoo. An essential aid for identifying the varied collection of birds in the huge, 'walk-through' Snowdon aviary is the series of illustrated tiles at the entrance and exit. Mounted on the walls of the pergola overlooking this spectacular new aviary is another attractive and worth-while innovation. This takes the form of an exhibit of large display panels which describe and illustrate several different aspects of bird biology.

Annual conference of the B.O.U.—The 1967 annual conference of the British Ornithologists' Union will be held in Swansea University from 31st March to 3rd April on the theme 'Predator/prey relationships in birds'. Accommodation will be in the University Residence Halls. Further details are obtainable from the Meetings Secretary, B.O.U., c/o Bird Room, British Museum (Natural History), London S.W.7.

Notice to Contributors

British Birds publishes material dealing with original observations on the birds of Britain and western Europe or, where appropriate, on birds of this area as observed in other parts of their range. Except for records of rarities, papers and notes are normally accepted only on condition that the material is not being offered to any other journal. Photographs (glossy prints showing good contrast) and sketches are welcomed. Proofs of all contributions are sent to authors before publication.

After publication, 25 separates of papers are sent free to authors (two or more authors of one paper receive 15 copies each); additional copies, for which a charge is made, can be provided if ordered when the proofs are returned.

Papers should be typewritten with double spacing, and on one side of the sheet only. Shorter contributions, if not typed, must be clearly written and well spaced.

Notes should be worded as concisely as possible, and drawn up in the form in which they will be printed, with signature in block capitals and the writer's address clearly written on the same sheet. If more than one note is submitted, each should be on a separate sheet, with signature and address repeated.

Certain conventions of style and layout are essential to preserve the uniformity of any publication. Authors of papers in particular, especially of those containing systematic lists, reference lists, tables, etc., should consult the ones in this issue as a guide to general presentation. English names of species should have capital initials for each word, except after a hyphen (e.g. Willow Warbler, Black-tailed Godwit), but group terms should not (e.g. warblers, godwits). English names are those used in *The Handbook of British Birds*, with the exception of the changes listed in *British Birds* in January 1953 (46: 2-3). The scientific name of each species should be underlined (but not put in brackets) immediately after the first mention of the English name. Subspecific names should not be used except where they are relevant to the discussion. It is sometimes more convenient to list scientific names in an appendix. Dates should take the form '1st January 1966' and no other, except in tables where they may be abbreviated to '1st Jan.', 'Jan. 1st' or even 'Jan. 1', whichever most suits the layout of the table concerned. It is particularly requested that authors should pay attention to reference lists, which otherwise cause much unnecessary work. These should take the following form:

- UCKER, B. W. (1949): 'Species and subspecies: a review for general ornithologists'. *Brit. Birds*, 42: 129-134.
WITHERBY, H. F. (1894): *Forest Birds: Their Haunts and Habits*. London. p. 34.

Various other conventions concerning references, including their use in the text, could be noted by consulting examples in this issue.

Tables should be numbered with arabic numerals, and the title typed above in the style used in this issue. They must either fit into the width of a page, or be designed to fit a whole page lengthways. All tables should be self-explanatory.

Figures should be numbered with arabic numerals, and the captions typed on a separate sheet. All line-drawings should be in indian ink on good quality drawing paper (not of an absorbent nature) or, where necessary, on graph paper, but this must be light blue or very pale grey. It is always most important to consider how each drawing will fit into the page. The neat insertion of lettering, numbers, rows, etc., is perhaps the most difficult part of indian ink drawing and, unless he has had considerable experience of this kind of work, an author should seek the aid of a skilled draughtsman.

Natural History Books *autumn publications*

PUBLISHED RECENTLY

- The Original Bird Paintings of John James Audubon. 2 vols.
boxed. 25 gns.
The Shell Bird Book by James Fisher. 25s.
On Aggression by Konrad Lorenz. 30s.
Birds of Europe with Gould illustrations. 2 vols. 30s.
Two in the Bush by Gerald Durrell. 25s.
A Field Guide to New Zealand Birds by Falla, Gibson and Tarbott.
30s.
In Search of Birds by Collingwood Ingram. 30s.
Mammals of Rhodesia, Zambia and Malawi by R. H. N. Smithers.
25s.
The Oxford Book of Flowerless Plants by F. H. Brightman. 42s.
Collins Pocket Guide to British Birds by R. S. R. Fitter and R. A.
Richardson. Revised edition. 30s.
Britain's Wildlife: Rarities and Introductions by R. S. R. Fitter
and J. L. Pemberton. 21s.
Pictorial Encyclopaedia of Plants and Flowers by F. A. Novak.
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Animal Paradise (Fauna of Galápagos) by Christian Zuber. 30s.
The Snow Bunting by D. Nethersole-Thompson. 30s.
Birds of the Atlantic Islands by David A. Bannerman. Vol. 3.
Azores. 84s.
Animal Magic introduced by Johnny Morris. 21s.
Grey Seal, Common Seal by R. M. Lockley. 27s. 6d.

TO BE PUBLISHED SHORTLY

- Introduction to South African Orchids by Dr. Schelpe. 6 gns.
Handbook of New Guinea Birds by Austin L. Rand and E. Thomas
Gilliard. £7 10s.
Plants of the World in Colour by H. C. D. de Wit. Vol. 1. 4 gns.
Zoos of the World by James Fisher. 45s.
Birds of North Africa by R.-D. Etchécopar and F. Huc. 6 gns.
Birds of Surinam by Frans Haverschmidt. 10 gns.
Penguins by Dr. J. Sparks and Tony Soper. 42s.
Seals by Gavin Maxwell. 35s.
Rhino by C. A. W. Guggisberg. 27s. 6d.
Men and Pandas by Ramona and Desmond Morris. 50s.
The Last Eagle by Daniel Mannix. 18s.
Birds of the Atlantic Ocean by Ted Stokes. 6 gns.

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British Birds

Vol. 59 No. 12
DECEMBER 1966



Eruptions of Bearded Tits during 1959-65

By H. E. Axell

R.S.P.B. Reserve, Minsmere, Suffolk

(Plates 74-78)

INTRODUCTION

AFTER BEING apparently nearly exterminated by prolonged severe cold and snow in early 1947, the British population of Bearded Tits (*Parus biarmicus*) steadily increased until, in the past decade, numbers in East Anglia have been higher than for a hundred years. Breeding in the fine, warm summer of 1959 was especially successful and in the autumn of that year long distance eruption movements began. These have occurred annually since then, with some return migration evidenced by ringing. The numbers involved and the movements across England are without recorded precedent. On an even more spectacular scale, after a huge upsurge in the new Oost Flevoland population in 1965, Dutch Bearded Tits also erupted and made history when a total of seven ringed ones were retrapped in England and Wales; in addition, one ringed in Hampshire in October 1965 was retrapped at a breeding site in the Netherlands in August 1966.

Space prevents the publication here of all the British records of Bearded Tits away from their breeding areas during 1959-65 or even the ringing recoveries involved. Figs. 1-7 on pages 522-525 show the pattern of records for each winter between autumn 1959 and spring 1966, however, and fig. 8 illustrates certain of the more interesting recoveries. In addition, complete lists of records and recoveries have been deposited with the editors of *British Birds* and are available for reference; also, many of the British-ringed recoveries may be found in Spencer (1966 and earlier), while the Dutch-ringed recoveries in Britain for the winter of 1965/66 are being given in full by Hudson (in press).

EARLY HISTORY OF THE BRITISH POPULATION

can be discovered from the literature that movements of Bearded

Tits to places distant from their breeding sites are not new, but, despite the early evidence being fragmentary and mostly of birds shot in winter, it is clear that such movements were never recorded on a scale remotely comparable with the present day eruptions. An indication of the early status of the species whereby the recent movements of a known population may be seen in perspective, is not easily obtainable from the old authors. For example, according to Gurney (1889), a description of a specimen shot in Norfolk was communicated by Sir Thomas Browne to John Ray, who published it in 1674. But Harting (1866) wrote, 'In the year 1743, the Countess of Albemarle brought with her from Copenhagen a large cage full of these birds . . . ; and some of these having made their escape, the Count de Buffon supposes that, from this circumstance, a colony was formed in England'. Edwards (1743), who called this species the Least Butcherbird, but referred to Albin's description of it under the name of Bearded Titmouse, observed that he was favoured with a sight of the birds brought over by the Countess and added, 'I have seen some others of the same kind, both cocks and hens, shot among the reeds in the marshes near London, though they are not well enough known to have a name.'

Whatever may have been the situation in the middle of the 18th century, it is certain that in the early 1800's the Bearded Tit bred in good numbers in suitable sites which then existed in the eastern counties of England from Huntingdonshire and south Lincolnshire to the north Kent marshes, while smaller colonies were to be found at widely separated intervals in Surrey and along the south coast in Kent (Romney Marsh), Sussex and Hampshire, also in Berkshire and along the Lower Thames (Yarrell 1837-43).

Soon after the middle of the 19th century, the colonies began to suffer severely as the reclamation of the coastal marshland destroyed or reduced the big reed beds to which the species is localised in England; and a similar situation existed on the Continent. Possibly of even greater significance in the latter half of the 19th century was the large-scale collecting of eggs and birds, a price as high (then) as four shillings for a dozen eggs being current, inducing such diligent searches that few of the first nests ever escaped (Booth 1881). Rivière (1930) referred to one Yarmouth dealer who received 113 eggs between 10th and 25th April 1876. The species was popular as a cage bird (e.g. Farrar 1905, Turner 1924) and was easily taken with nets and lured sticks. Yarrell mentioned that it was very abundant in the Netherlands, from which country numbers of live birds were exported to the London markets for sale at four or five shillings a pair.

On occasion, drastic reductions were caused by severe weather and a combination of all these factors brought about a progressive decrease in the Norfolk Broads population (by then the main stronghold) which was tabulated over six decennial years by Gurney (1900) as 200 pairs

ERUPTIONS OF BEARDED TITS

in 1838 reducing to only 33 successful nests in 1898. In Suffolk, by about the end of the 19th century, Bearded Tits had become practically extinct for the same reasons (Ticehurst 1932) and the species was doubtfully retaining a foothold in Essex (Christy 1913), north Kent (Harrison 1953) and a very few of the South Coast sites (Walpole-Bond 1938). A pair with fledged young at Hornsea Mere in Yorkshire in 1901 (Nelson 1907) appears to have been only an isolated record at this time.

POPULATION BUILD-UP IN THE PRESENT CENTURY

Helped by awakened public sentiment (the Bearded Tit was included in the Wild Bird Protection Act in 1895), and especially by protection given by the Norfolk and Naturalists' Trust and other landowners, the small colonies began to increase in Norfolk so that there were 80 nests in that county in 1916 (Gurney 1917) and the species again bred in Suffolk. A long, cold winter in 1916/17, however, caused such a large-scale reduction that only one brood was known at Hickling, Norfolk, a main breeding site, in 1917 and none was seen there nor at

Table 1. Breeding population of Bearded Tits *Panurus biarmicus* in England, 1947-65

Eruption years are in bold type. Totals are based not only on county reports but also on unpublished information provided by local observers. The population in 1947, after severe weather in the early part of that year, was the smallest ever recorded. Some new sites to which the species turned when various traditional areas were damaged by sea floods in early 1953 have remained occupied each year since

Year	Approximate known breeding pairs				Previous winter
	Norfolk	Suffolk	Elsewhere	Total	
1947	10	2-4		2-4	Severe frost and snow
1948	3	10		13	
1949	5	24		29	
1950	11	36		47	
1951	7	20		27	
1952	10	40		50	Sea floods in some areas
1953	12	16		28	
1954	35	25		60	
1955	49	30		79	
1956	28	35		63	
1957	68	40		108	Severe frost
1958	57	40		97	
1959	85	100		185	
1960	115	105	1	221	
1961	127	140	3	270	
1962	145	140	13	298	
1963	67	65	7	139	
1964	101	105	10	216	
1965	137	120	12	269	

Horsey in the following December (Jourdain and Witherby 1918), but this near-disaster was followed by a longer period of recovery and breeding began to occur in new sites in East Anglia until the sea floods of February 1938 and the severe winter of 1939/40 cut down the colonies again to only a very few pairs. Yet again numbers began to be restored in the larger reed-beds but the recovery period lasted only until early 1947 when there was an unbroken period of six weeks' hard frost and deep snow. This time the reduction was on such a scale that, in the ensuing fine summer, only a single male was reported in Norfolk (*Norfolk and Norwich Nat. Trans.*, 1947) and the two, possibly four pairs in the R.S.P.B. reserve at Minsmere, Suffolk, represented the only recorded breeding stock in England (*Suffolk Nat. Soc. Trans.*, 1947). With ample reason at that time, some eminent authors expressed the gravest doubts for the survival of the species in this country.

The recovery after the species was apparently nearly exterminated in 1947 (see table 1) was described by E. M. Nicholson in 1949 as 'almost miraculous'. Bannerman (1953) and others found it difficult to believe that such a recovery was possible without immigration from overseas. But, though perhaps on a less dramatic scale, Continental populations had also suffered high mortality in prolonged periods of hard winter weather and there can be little doubt that many more birds survived the 1946/47 winter in East Anglia than were supposed.

Helped, certainly, by successive mild winters and several good breeding seasons after overcoming yet another set-back due to sea floods over some sites in January 1953, the species steadily built up and had become so numerous in East Anglia just before the great frost of 1962/63 as to merit the classification of being abundant in three localities in Suffolk (Payn 1962) with high populations in the Norfolk Broads and a colony at Cley (*Norfolk Bird Report*, 1961).

The number of Bearded Tits surviving the great frost which lasted from 23rd December 1962 to 4th March 1963 was remarkably high compared with the almost disastrously few found after the prolonged severe weather of early 1947 (table 1). In this earlier cold spell, snow covered the reed panicles and the bottoms of the reed-beds for many weeks, denying the Bearded Tits access to much of the debris and broken reed stems in which to search for food. The severe weather in the winter of 1962/63, however, produced comparatively little snow in coastal Suffolk and the reed debris remained largely uncovered, so that, despite the persistently lower temperatures, what little vegetable (seeds) and animal food was available was at least accessible. On some occasions, however, conditions as dangerous as deep snow resulted from frozen fog coating the standing and fallen reed with ice. Recurrences of these conditions and their persistence all day began drastically to take toll towards the end of February 1963, after eight weeks of very low temperatures, so that little food could be obtained on hard-frozen,

open ground and the thaw on 4th March came at a time when numbers of Bearded Tits were becoming noticeably fewer daily.

THE 1959 BREEDING SEASON AND THE FIRST ERUPTION

The winter of 1958/59 had not been hard and good numbers of Bearded Tits survived to begin breeding early; at Minsmere, first eggs were laid in the first week of April and late snows and frosts, disastrous to early broods, did not occur. The late spring, summer and autumn of 1959 were outstandingly fine and warm with little disturbance from low-pressure systems. At Minsmere, excluding days of negligible precipitation, there was some rain on 16 days in April, four in May, four in June, six in July, six in August, none in September and none in early October. In this good weather over a long period, the breeding of the Bearded Tit was spectacularly successful, many pairs having three broods, and the high degree of fledging success was apparent in the remarkably large number of juveniles throughout the reed-beds in all sites in Norfolk and Suffolk.

Flock size in late autumn was the greatest known in this century up to that time. A compact group of at least 90 was seen at Horsey (Norfolk Bird and Mammal Report, 1959: 109). At Walberswick, Suffolk, members of the Dingle Bird Club recorded flocks of up to 100 and a total of at least 800 was estimated as being present by mid-September; an estimated population of 1,000 at Walberswick later in the month may have been accounted for by the addition of passage birds from other East Anglian colonies. At Minsmere, about 300 were present at the end of the breeding season.

In East Anglia as a whole, the population in the autumn of 1959 was higher than it had been for about the previous 100 years. High flying and other excited group activity, apparently stimulated by the exceptionally large numbers in each breeding site and made possible by the succession of days of fine, quiet weather, occurred on a hitherto unknown scale. Moderately high flights, up to 100 feet, had rarely been recorded previously, but had begun to be noticed on a few occasions during fine, quiet mornings in 1957 and 1958 when increasing numbers had bred.

The actual departure of Bearded Tits from their breeding site was first witnessed at Minsmere, the birds maintaining a constant heading and rising steadily to more than 400 feet. In the autumn of 1959 and the ensuing winter, the occurrence of Bearded Tits hundreds of miles from East Anglia was an event of considerable importance in that, except for local wandering, which was well-known, and a report of 100 in Kent in 1941 (Gregory 1942), they had been almost entirely resident during this century. The long-distance movements have now become, at least for this most westerly population in Europe, an annual phenomenon and they occurred even in autumn 1963 after the extremely

severe weather of the previous winter had greatly reduced the number that were to breed that year.

EMIGRATORY ACTIVITY 1959-1965

Pre-moult activity by juveniles

After a short period when first-brood juveniles were seen with adults, groups of unmoulted young Bearded Tits began to amalgamate and in late June wandered around the reed-beds, mainly in groups of about 20, but up to 40 when first broods had been especially successful. Generally at this time, only short flights were taken, just above the heads of the old reed and mostly in quiet weather in the morning until 10.00 GMT and again at dusk. The birds were not noisy unless approached, when they would climb to the tops of the reed and appear to be excited and inquisitive about the observer. The proximity of a Coypu *Myocastor coypus* or the sudden appearance of a Marsh Harrier *Circus aeruginosus* also caused noisy outbursts.

A period of more excited activity by unmoulted juveniles, with considerable calling and moderately high flying up to 50 feet, was observed during July and was most noticeable in 1959, 1960, 1964 and 1965. This excited behaviour, presumably by first-brood birds, was a period of activity quite separate from the eruption-excitement period proper which began when most adults and first- and second-brood juveniles had completed or nearly completed the moult by about mid-September. At Minsmere, in this mid-summer period, pre-moult excited behaviour of juveniles often took groups to the edge of the marsh, sometimes to the tops of tall oak trees and to hedges a few hundred yards from the reeds. Once, on 6th July 1964, five juveniles flew across a field to a hut on the reserve, some landing on a window ledge and fluttering against the glass. Remarkably, on two occasions, some birds in juvenile plumage were seen to fly right away from the breeding site: at 07.00 on 7th July 1961 a flock of about 30 were flying around at 50 feet at the west edge of the Minsmere reed-beds and three of these left the flock to fly south over East Bridge village to be lost to sight. Early on 7th July 1964 five juveniles flew high over a belt of trees and disappeared inland across some low hills. Three juveniles were trapped between 29th July and 3rd August 1960 at Abberton, Essex, where no breeding was known in that area.

After this period of activity by unmoulted juveniles—a phenomenon apparently not recorded before 1959—young birds passed through a quiet time and their presence was much less noticeable during August and early September of each year until most had moulted. A similar event was observed in recent years at Walberswick where D. J. Pearson had been studying moult periods by large-scale trapping of this species.

Pre-eruption behaviour

Consolidation of small groups of adults and birds of the year occurred during the first fortnight of September, with many outbursts of social chattering not provoked by possible predators. Longer and higher flights took place at this time. Excited activity was always much more in evidence in quiet weather, especially on sunny days, and occurred almost entirely between 07.00 and 09.00 GMT. Noisy high flying after midday was rare and occurred when bad weather had moderated. On mornings of little wind, small groups of four to 20 would rise from larger parties in the reed beds, calling noisily, and climb as a fairly compact small unit to 100-300 feet and fly in any direction to another area of the marsh, descending very steeply before levelling off just above the reed tops. Very approximately, only one in 50 of the birds engaged in these flocks was still in juvenile or unmoulted adult plumage.

Eruption behaviour

The Minsmere reed-beds attenuate south-eastwards towards a sluice at the shore. At this point, observation on migration in general has been made on almost every morning, except for a few gaps in 1959 and during impossible weather, from soon after dawn, throughout the springs and autumns of each year 1959-66. When the wind was from any southerly point, it was this peninsula of reeds near the shore that served as the Bearded Tits' concentration area and main point of departure. Observations in other areas of the 400-acre reed-marsh were necessarily much less consistent, but it was evident that a secondary emigration did occur occasionally from the western extremity of the reed-beds, near East Bridge village. At this point, early morning concentrations were much smaller, when they did occur, compared with those at the sluice. At the East Bridge corner, however, what few departures were observed were more consistently into the wind, small numbers being seen to head off inland directly into the wind from any westerly point. At the sluice, movement away was invariably due south, along or parallel with the dunes when the wind was from any southerly point between east and west. With a northerly wind, much smaller concentrations occurred at this point near the shore and departures high to the north were seen only twice. Emigration northwards into northerly winds was seen occasionally to begin from the reeds in the north-east corner of the marsh, one mile from the southward take-off point at the sluice. Apparent immigrations into Minsmere from the south, when the wind was northerly, were seen on five occasions in the autumns of 1959-65, always in late morning and some hours after local high-flying activity had ceased.

The Bearded Tits' movements away from the sluice area occurred in each year from the third week of September and continued erratically, depending upon weather conditions, sometimes until as late as early

November. Most movement occurred in October, coincident with the coasting migrations of other small diurnal migrants, mainly finch species. Finch migrations, on days of southerly winds and some cloud, were generally from half an hour before sunrise until two and a half hours later and the Bearded 'Tits' movements were invariably later, beginning when the finch passage was thinning. Other differences were that they flew higher than the finches, their ground speed was slower and they did not move into winds of over force 4, whereas most of the finches coasting into the wind were stopped only by winds of over force 6. But, like the finches flying low enough to be observed, the Bearded Tits moved south along the north-south coastline only when the wind had no northerly component. On one occasion, 29th October 1961, a group of five Bearded Tits were overtaken by a flock of Tree Sparrows *Passer montanus* flying rather high in quiet weather (wind south-west, force 1, and three-eighths cloud). The tits kept pace for a while, speeding up, but were gradually left behind. Three times in the autumn of 1961, small groups of Bearded Tits, flying off south, rose to such a height that they could not be followed with 10x50 binoculars. Good visibility and little cloud were not a prerequisite for emigrations which, in fact, frequently occurred under complete low overcasts but in light winds. Once, on 10th November 1961, four, out of five which started, flew off south down the coast and were lost sight of in a fog bank three-quarters of a mile from their starting point.

The peninsula of reeds near the sluice served not only as an assembly and take-off point for would-be travelling Bearded Tits, but appeared also to be a staging point for groups passing through from the north. Here, on several occasions in most years, small groups of ringed birds were seen amongst others, often also with colour rings of the pattern currently in use by the Dingle Bird Club at Walberswick, five miles to the north, where 166 Bearded Tits were ringed in 1959, 316 in 1960 (150 also with red rings), 192 in 1961 (all also blue), 250 (150 also yellow) in 1962, 20 (all also green) in 1963, 35 in 1964 and 490 (360 also red) in 1965. At least up to 1961, very few Bearded Tits had been ringed in England outside the Walberswick reed-beds.

Flocks of 20 to 60 accumulated near the sluice from smaller groups which began to converge there from about 07.00 GMT and made short, restless flights, up to 100 feet, in a small area. From such assemblies, parties of any number up to 25 would fly up remarkably steeply (see plate 75a) and make off southwards into the wind along the line of the dunes, climbing progressively. In their initial climbing flight from the reed-beds, the birds' bodies were at a steep angle, their short, rounded wings whirring with frequent, regular pauses, so that their rate of climb was virtually constant. Once, a Dunnock *Prunella modularis*, which also has quite short, rounded wings, rose with a flock

of Bearded Tits and this bird kept its body more nearly horizontal and climbed in zig-zag stages.

In most cases, the groups of Bearded Tits returned to their starting point after covering a distance of 200-800 yards. Flight behaviour on the outward trip was as a fairly close flock, but with much individual changing of position. Very much indecision during the first few hundred yards of departure flight was apparent on every occasion, with sometimes two birds or sometimes half the flock turning back, often followed presently by the rest. Sometimes a flock would reverse direction two or three times before deciding to advance or return; sometimes it would break up in ones and twos until the whole had returned or a minimum of two were left flying away decisively. The flight of those returning to the reeds was quite different from the outward behaviour in that, down-wind, it was considerably faster, straight and direct, with little or no position changing; the birds were also noisier.

Observed occurrences of Bearded Tits in the British Isles at points far distant from their English breeding sites are shown in figs. 1-7. It will be noticed that birds travelled far greater distances in the autumn and winter of 1965 (fig. 7), but the participation then of many Dutch birds is evidenced from the trapping in England and Wales of seven with Arnhem rings (Hudson in press).

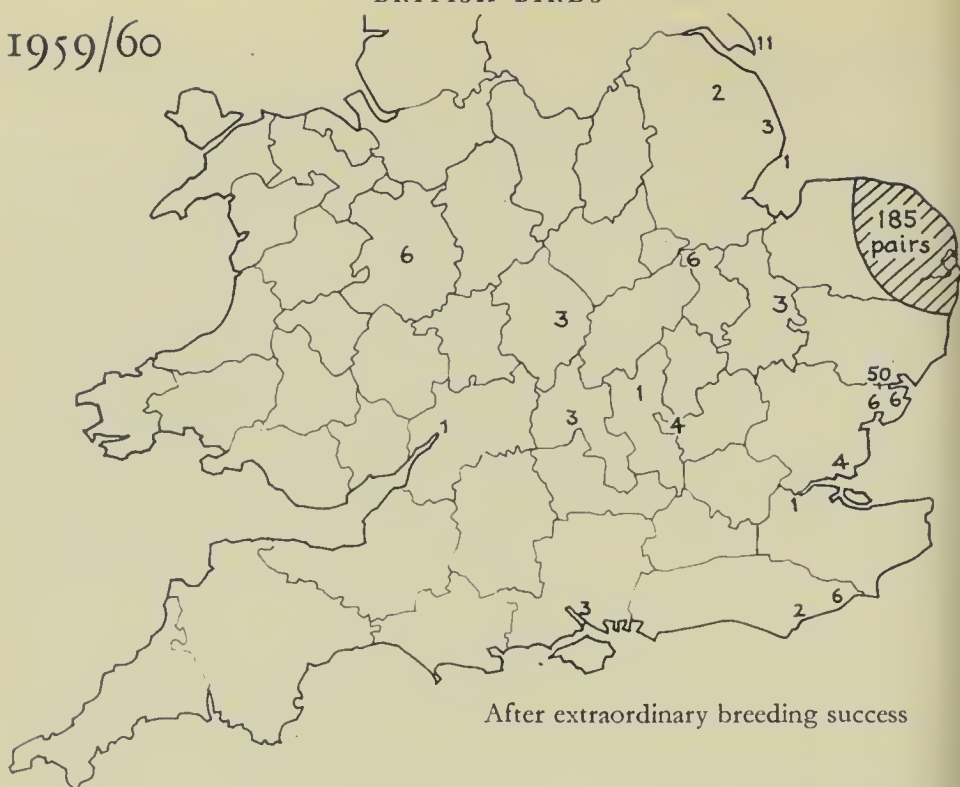
POST-ERUPTION ESTABLISHMENT OF NEW BREEDING SITES

The wide dispersion and search for new feeding areas led many Bearded Tits to the discovery of reed-beds distant from East Anglia, where, apparently, breeding and food requirements could be met in sites as large as some they had left and where at least a no more rigorous climate could be enjoyed. As with other eruptive species, e.g. Cross-bills *Loxia curvirostra*, some new, temporary colonisation did in fact result whilst some former breeding areas were recolonised and are still being used. Only two of the five or six new sites were distant from East Anglia and in all cases the locality has been suppressed at the wish of responsible local ornithologists.

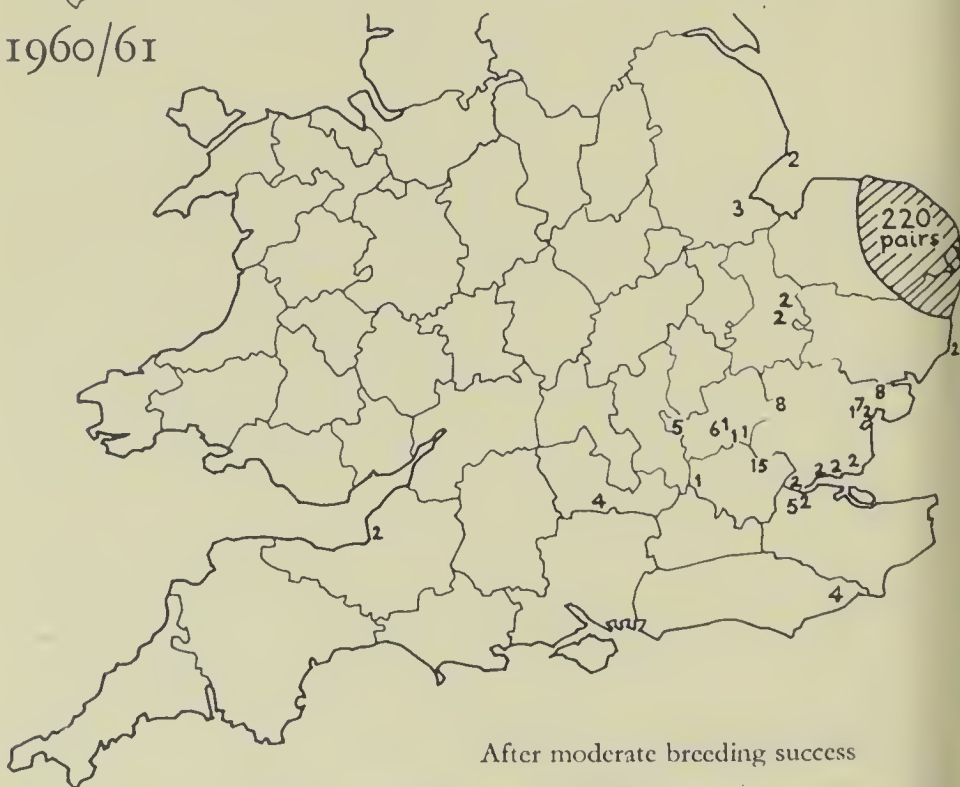
In one new site north-west of Norfolk, one pair apparently bred in 1960, a pair had young in 1961, a pair probably bred in 1962 and then, following the severe winter of 1962/63, no other breeding in this site was thought to have occurred. In Essex, a pair was present during the 1961 season, but breeding was not proved; up to five pairs were present at this site in the 1962 season, two pairs being known to have bred successfully, but this small colony was reduced to only one successful pair in 1963 and one probably successful pair in 1965.

In one north Kent site, a very few pairs are said to have bred from 1960 until 1963 when two pairs are known to have raised three broods; the area was drained in 1964. One pair bred in each of two other areas

1959/60

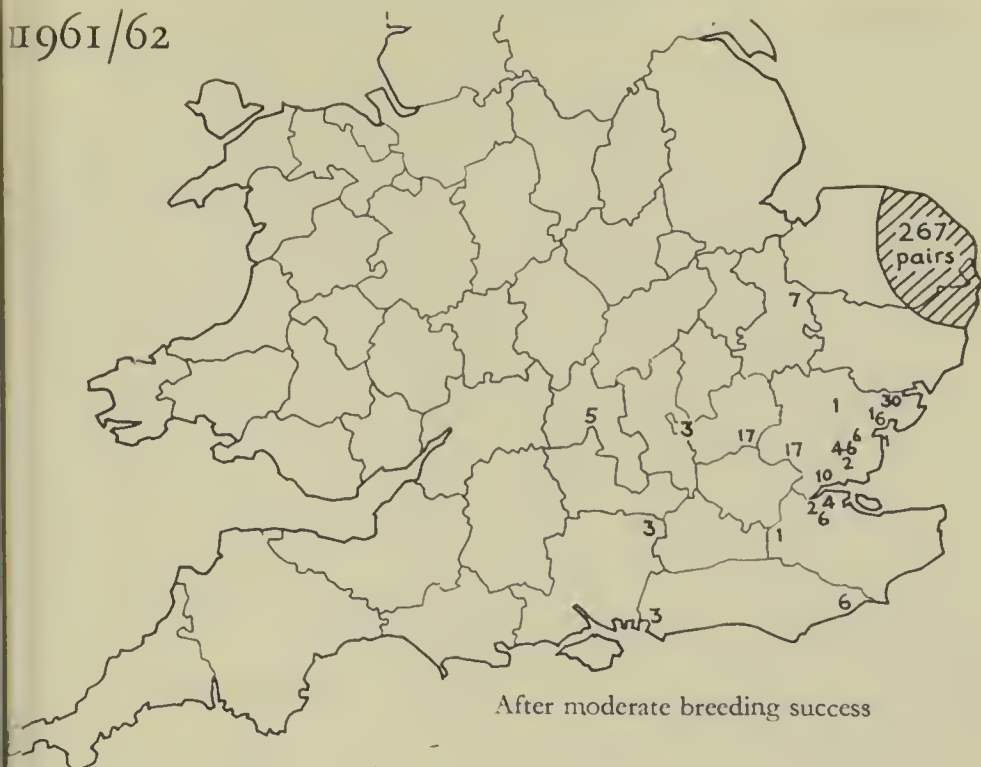


1960/61



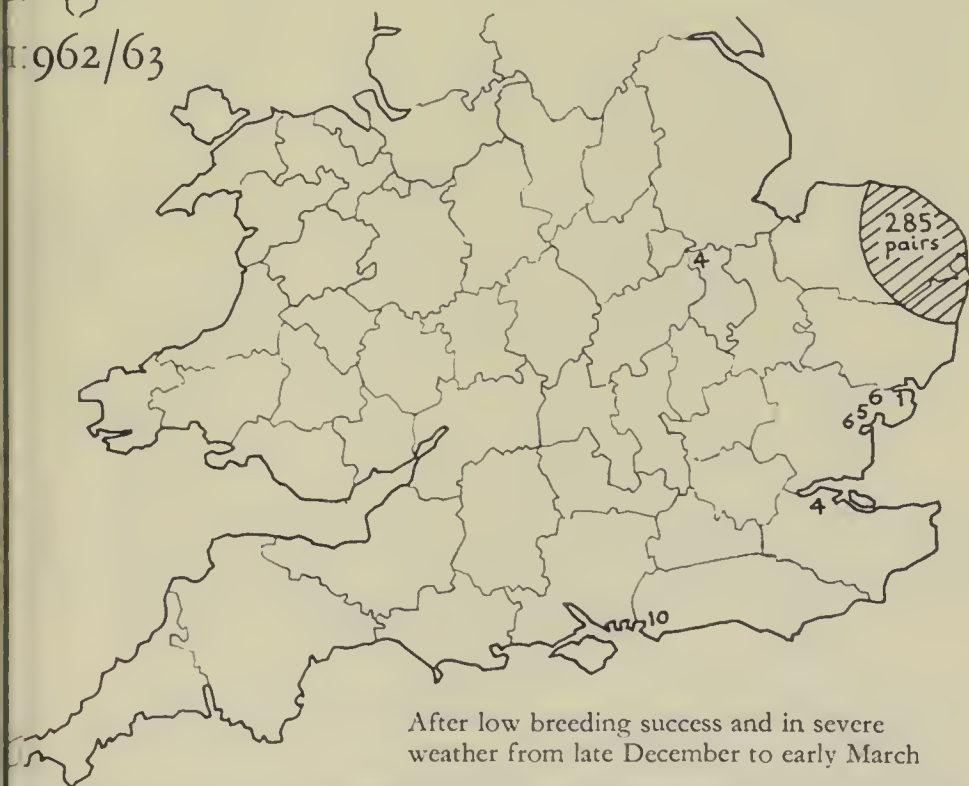
FIGS. 1 and 2. Numbers of Bearded Tits *Panurus biarmicus* recorded away from the main breeding areas, autumn 1959/spring 1960 and autumn 1960/spring 1961. The estimated size of the East Anglian population is given in the shaded part, but small new breeding sites elsewhere are not shown (drawn by Robert Gillmor)

1961/62



After moderate breeding success

1962/63



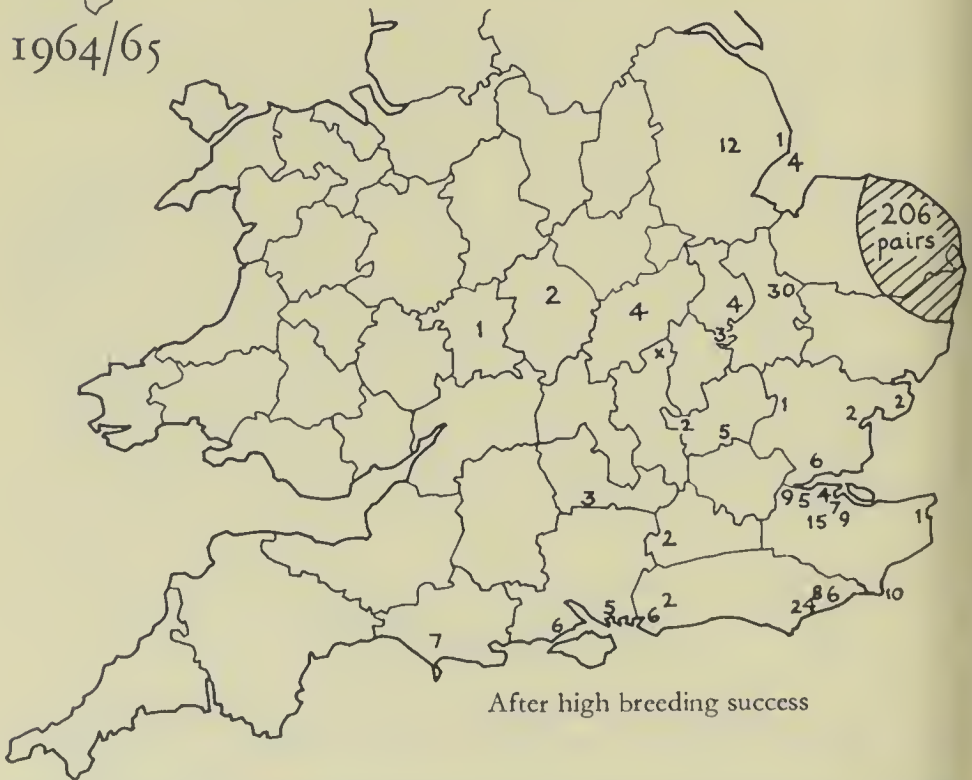
After low breeding success and in severe weather from late December to early March

FIGS. 3 and 4. Numbers of Bearded Tits *Panurus biarmicus* recorded away from the main breeding areas, autumn 1961/spring 1962 and autumn 1962/spring 1963. The estimated size of the East Anglian population is given in the shaded part, but small new breeding sites elsewhere are not shown (drawn by Robert Gillmor)

1963/64



1964/65



FIGS. 5 and 6. Numbers of Bearded Tits *Parus biarmicus* recorded away from the main breeding areas, autumn 1963/spring 1964 and autumn 1964/spring 1965. The estimated size of the East Anglian population is given in the shaded part, but small new breeding sites elsewhere are not shown (drawn by Robert Gillmor)

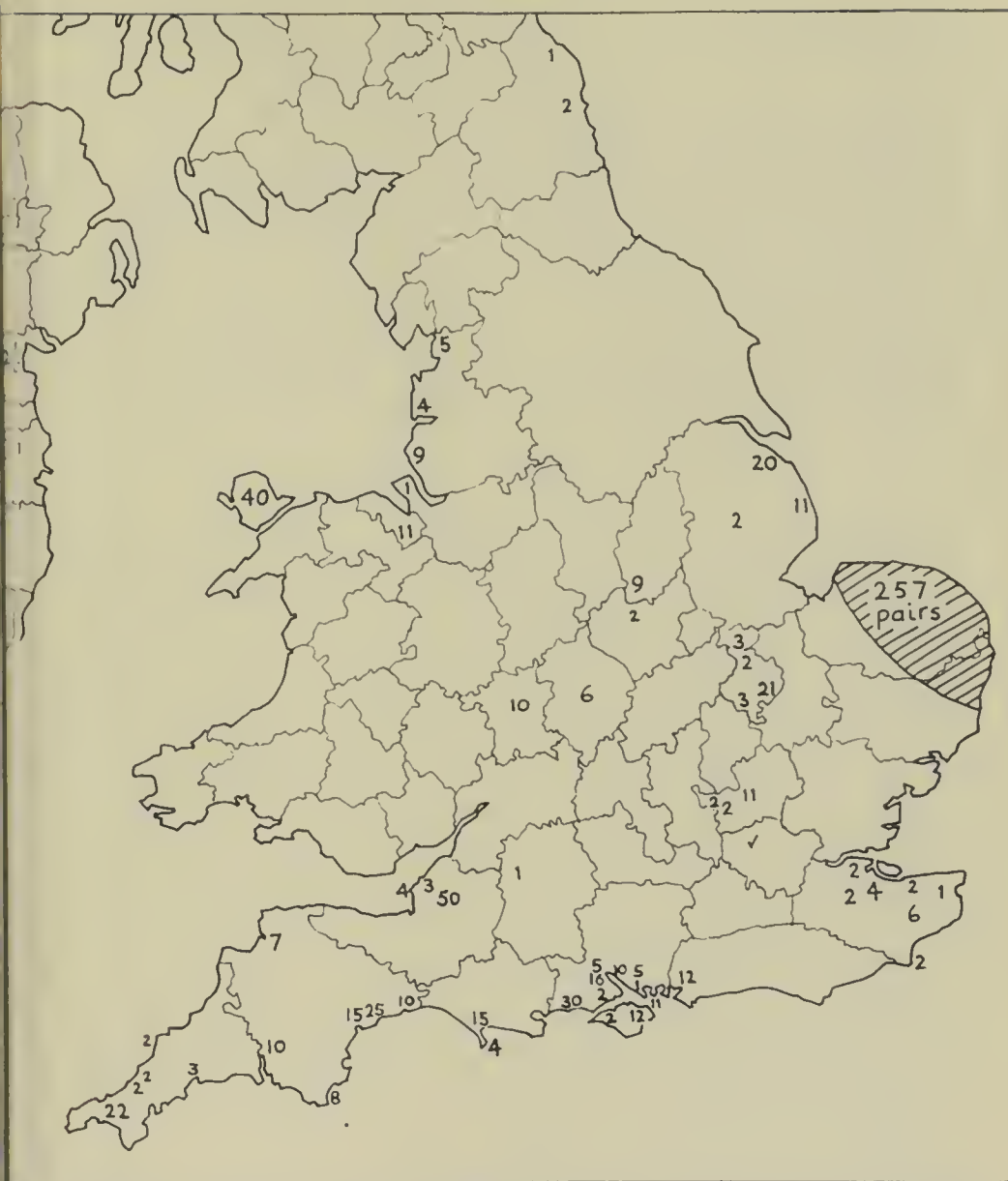


Fig. 7. Numbers of British and Dutch Bearded Tits *Panurus biarmicus* recorded in England, Wales and Ireland away from the main breeding areas, autumn 1965/spring 1966. The estimated size of the East Anglian population is given in the shaded part, but small new breeding sites elsewhere are not shown (drawn by Robert Gillmor)

in Kent in 1961: one of these sites, in the north of the county, had a pair there again in 1962 but not subsequently; while at the other, in the Stour Valley, the number grew to three pairs in 1962 and five in 1963 (despite the severe winter of 1962/63), and this colony still continues slowly to increase. At a fourth site in Kent, one pair bred in 1963.

In a large reed-bed near the coast in central southern England, at least one pair raised young in 1965, but much of the reed was later cut.

In an adjacent county, a pair nested in 1966. In Norfolk and Suffolk, some old sites were recolonised and breeding occurred, and still occurs, in some new sites, including one especially small reed-bed at Holme, where a pair raised young in 1964.

Following the recent great upsurge in the Dutch population in Oost Flevoland, a few pairs have again begun to breed in the Naardermeer, an old site from which any colony has been absent for over forty years. A new colony of five or six pairs on Norderney, in the East Frisian Islands, Germany, in 1965 and some pairs also breeding on the mainland of Oostfriesland near-by were considered to have resulted from eruptions of Dutch birds (Temme 1966). In 1966, a new colony of about ten pairs bred at Durgerdam, north-east of Amsterdam.

RETURN MIGRATION

At Minsmere and Walberswick, after those occasions when the local population had become reduced by the previous autumn's eruptions and periods of hard weather in winter, a build-up of the breeding stock has always occurred in March and April. In earlier years, population increases in early spring had been noted by J. Vincent at Hickling. During mild winters, on the other hand, when the resident population had been high, a diminution occurred in March, suggesting the return of some birds to other breeding sites. Thus, when about 250 had been present at Minsmere during the winter of 1961/62, 40 pairs remained to breed; after 150 had wintered in 1963/64, 32 pairs were present in the following breeding season. More than a dozen colour-ringed birds from Walberswick have wintered at Minsmere, five miles to the south, but only three of these have been known to stay and breed.

Small, close flocks of probable new arrivals have also occurred after the breeding season has begun. Thus, six males were seen together on 8th April 1962; a new flock of seven birds was seen on 14th April 1965; and a flock of twelve occurred on 27th April 1966. Each of these was seen on the one day only. So far, the only observation of migratory high-flying in spring has been on 23rd April 1965 when, at 06.30 GMT, two flew off south along the dunes, but they returned after travelling three-quarters of a mile. Ringing controls indicative of return movements to breeding sites are shown in fig. 8. The one ringed at Stanpit, Hampshire, and controlled in the Netherlands was one of 26 trapped out of over 30 which occurred there, a non-breeding area. It is especially important as the first foreign recovery of a Bearded Tit ringed in Britain and is the first probable instance of return migration over sea.

APPARENT MOVEMENT IN PAIRS

During the period of eruptions 1959-65, many instances were reported where just two birds appearing together in a non-breeding area were male and female. In *Het Vogeljaar* for December 1965, the editors

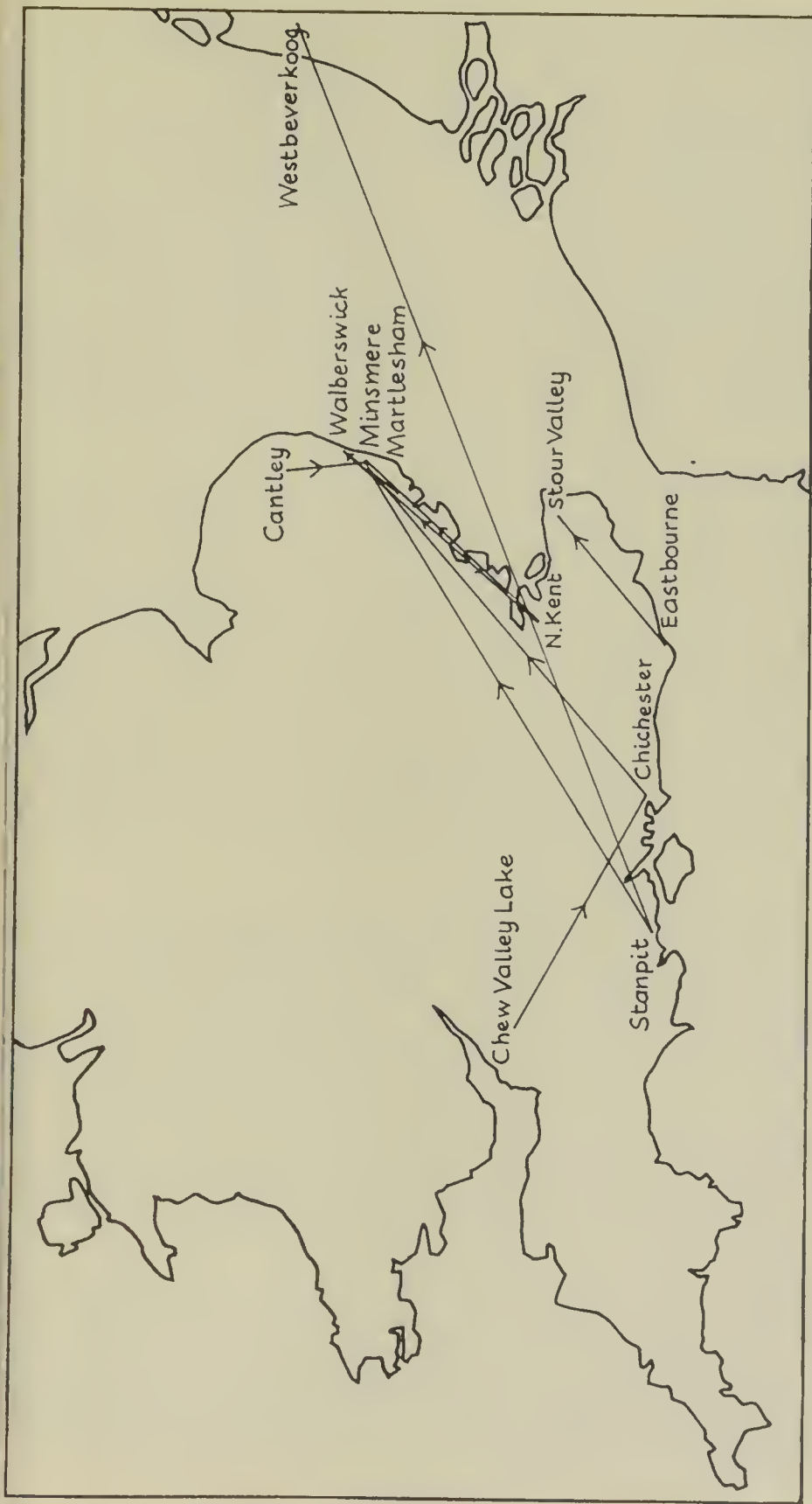


FIG. 8. Return migration of British and Dutch Bearded Tits *Panurus biarmicus* to their breeding areas as evidenced by British ringing recoveries
(drawn by Robert Gillmor)

referred to the two birds with consecutive ring numbers caught together at Shotton, Flintshire, on 31st October 1965, which had been ringed as juveniles, male and female, near Kampen, on 6th August 1965 and stated that the impression already gained from field observation in the Netherlands was that the species moves about in pairs. At Minsmere, observations of activity outside the breeding season also show such a tendency. A study of early pair-formation by Bearded Tits while still in juvenile plumage at an age of two and a half months, with courtship-actions by the male, is referred to by Lorenz (1952).

Often at Minsmere, but not in every case, two birds returning to the reeds after having broken away from an emigrating flock were seen to be male and female. Three pairs, ringed on various dates at Walberswick, have been controlled at Minsmere, still together, after three days, nine days and 16 months respectively.

Other recoveries have been suggestive of movement in pairs. Two migrants ringed consecutively at Portland Bill, Dorset, on 17th October 1965 were retrapped 57 miles to the north at Chew Valley Lake, Somerset, on 24th October 1965 (female) and 13th November 1965 (male). A juvenile male and a juvenile female ringed at Walberswick on 5th August 1965 were retrapped 25 miles NNW on 26th December 1965 at Cantley, Norfolk, where another pair were ringed on this day and were found 29 miles SSE on 25th September 1966 at Minsmere. A male and a female, both juveniles, ringed at the breeding site in the Stour Valley, Kent, on 13th June 1965 were retrapped in north Kent on 30th October 1965. The two birds together in Co. Louth on 3rd January 1966, the first ever recorded in Ireland, were male and female.

MOVEMENTS IN BRITAIN BEFORE 1959

Although, in the past, Bearded Tits have been claimed by many authors to be non-migratory and even 'hardly addicted to wandering', there are a considerable number of records in the last hundred years and more of small flocks at places distant from the breeding sites then known. As has been remarked, however, the early records give no indication that distant movements occurred on such a scale as has been annual in England since 1959 and as took place from Holland in 1965. Since the species was eagerly sought by collectors and is one which makes its presence known, especially in winter, this is unlikely to be entirely due to the present-day plethora of observers and reed-bed ringers using mist-nets.

Yarrell (1837-43) noted that, during the autumn and winter, small parties were to be found dispersed in large tracts of reeds throughout the whole Suffolk coast. Christy (1890) referred to winter flocks on both sides of the Thames estuary where they had formerly bred and Ticehurst (1932) cited J. D. Hoy's records of flocks in winter at non-breeding sites in East Anglia.

In a summary of the Hertfordshire records, Sage (1959) instanced a small flock in late November 1848 at Orton Head and a pair shot on 21st December that year near Tring. A male was seen on 12th July 1888 near Bishop's Stortford where breeding had apparently not occurred. In about 1900, some were imported from the Netherlands and released at Wilstone Reservoir; they soon disappeared, but one occurred in west Hertfordshire in January 1905 (Bickerton 1905). From neighbouring Middlesex, Glegg (1935) cited three records: one involved two males, one shot, near Edgware on 15th December 1794; the others—both, perhaps significantly, in May—concerned one on the River Brent in 1896 and a pair in Enfield Chase in 1913. In Surrey, Bearded Tits were recorded on several occasions before 1850, occurring, apart from the Thames-side 'residents', in the Godalming area where specimens were obtained (Bucknill 1900).

Distant from any known breeding site then, a singular record was of one on St. Mary's Moors, Isles of Scilly (Clark and Rudd 1906); there were no records for Cornwall in Ryves (1948), although Yarrell had mentioned that one had been taken near Helston. Also now apparently considered doubtful was the reported breeding in Devon at Slapton Ley and on the Exe estuary in the last century. In about 1889, of twelve on a salt marsh in autumn at Barnstaple it was said, 'It is probable that these individuals were immigrants from the Continent' (Pidsley 1891).

In Somerset, the *Proceedings of the Somerset Archaeological and Natural History Society* (1880) cited a pair shot at Burnham in 1833. Miss E. M. Palmer (*in litt.*) tells me that the *Victoria County History* referred to a flock near Bridgwater in about 1840 and a pair shot near Wells in the spring of 1861. A pair was seen near Bridgwater in February-March 1922 and one near there on 29th February 1928 (S. Lewis unpublished), probably also a pair in May 1941. Pennant (1812) referred to the species having occurred near Gloucester and other early authors often mentioned its being seen at the beginning of the 1800's up the Thames Valley to Gloucestershire. Three were obtained, possibly near Stonehouse, between 1865 and 1870 (Mellersh 1902).

In Dorset, the species was described as a rare and very exceptional visitor (Mansel-Pleydell 1888). There were more occurrences, however, in adjacent Hampshire where, in early years, it was probably breeding on the Boldre Stream and on the Itchen as late as 1902 (Kelsall and Munn 1905); specimens were killed on the Hampshire Avon in 1847 and 1854. On the Isle of Wight, Kelsall and Munn recorded one at Ryde 'some years ago' and mentioned more recent observations without quoting months, so that these birds may well have been at least wanderers from the mainland. Cohen (1963), adding to the older Hampshire records, included one at Titchfield Haven on 3rd July 1911, another there on 1st February 1927 and a pair reported at Hengistbury

in early August 1935; there was also a record of one at Winchester on 3rd and 5th November 1956.

In the Kennet Valley of Berkshire, Bearded Tits were said to have bred early in the last century and were called 'fairly common' by Kennedy (1868). Summers-Smith (1951) gave the last breeding record as about 1814. There was a single bird near Theale on 30th August 1916 (Radford 1966). Aplin (1889) said that it was undoubtedly breeding near Newbury, Berkshire, in about 1814; and some years before 1849 one was shot near Oxford, this record being the basis of Yarrell's claim that it was found up the Thames Valley as far as Oxford; one also occurred near there on 22nd January 1883. A pair was seen at Wytham on 18th April 1924 and one at Bloxham in June 1933 (Radford 1966).

In Sussex, small numbers bred at Winchelsea in and before 1802, at Amberley in 1844 and soon after, also at Lancing (Borrer 1891). Walpole-Bond (1938) suggested that the Winchelsea colony survived until about 1845 on the basis that the species continued to breed elsewhere on Romney Marsh for another decade. Many other Sussex records were included by the same author. One was killed at Fishbourne in 1849 and two others there before 1863; one was taken between Lewes and Newhaven in January 1803 and a pair at Southover at the end of November 1851. Bearded Tits were not unusual on Pevensey Level before 1849 and then occurred there rarely until the larger reed-beds were destroyed between 1860 and 1870. Several were shot in 1844 at Amberley Wildbrook, where they bred. Breeding in Sussex was thought to have ceased between 1875 and 1880, although there is a record of one in May 1892 at Lancing and one on 13th April 1908 between Rodmell and Newhaven. A few occurred near Battle between 1902 and 1908; and one was seen near Rye, out of the breeding season, in 1915. One was recorded in April 1923 in the Stoke Marshes where, later, one was shot; and another occurred at Amberley Wildbrook at about the same time; in late May that year one was also seen at Chailey.

In the Thames Estuary marshes of north Kent up to Deptford, the colonies became reduced as a result of collecting and loss of habitat through riverside commercial development, and the species ceased to breed in this once large area of reeds by about 1871-74. An isolated record, perhaps of breeding birds, was of two in a north Kent marsh on 23rd May 1908 (Gillham and Homes 1950). Sporadic breeding occurred on Romney Marsh until about 1844 (Ticehurst 1909), and the probability of breeding at isolated sites at Kemsley some time between 1870 and 1885, near Tunbridge Wells in 1904 and in Thanet in 1926 is mentioned by Harrison (1953) in his detailed summary of the county records; also a pair was seen near Birchington in the spring of 1939 and one in the same period near Seal. The most outstanding of

any of the pre-1959 records of birds in non-breeding areas was by Gregory (1942) who estimated 100 were present in an east Kent marsh late in 1941, the birds being said to have left in the following March; many fewer were present there in the following winter of 1942/43 and none was present in 1944. In this connection, Harrison recorded that two were 'obtained in an east Kent marsh' on 27th December 1941 and in the same locality a male was shot on 5th April, a female on 18th April and a male on 9th July. Further, Gregory informed Bannerman (1953) that, in eastern Kent in July 1942, a small family party was seen and an adult female which had an incubation patch was obtained. Fortunately, during the present series of eruptions from East Anglia, the law appears to have been better upheld and a small colony has re-established itself in this area. Further records in Harrison (1953) are of a pair in this same locality in the winter of 1948/49 and a male near-by at Grove Ferry on 26th August 1950.

Across the Thames, Bearded Tits were to be found in the Essex salt marshes at least up to 1829 (Babington 1884-86); and Christy (1890) recorded that they once bred commonly in the county, but probably had ceased to do so. Some wandering from the main East Anglian colonies had occurred, but the erupting birds reaching Cattawade Marsh in October 1959 were the first in the county for over 30 years (*Essex Bird Report*, 1959: 33).

In Norfolk, the main breeding sites were, and are again, along the River Bure, its tributaries and the associated waters of Heigham, Hickling, Horsey and Whiteslea, and also at Cley, with sporadic breeding in other smaller broads of the rivers Waveney and Yare. In Suffolk, the old breeding haunts were in the several coastal reed-beds from Oulton Broad to Bawdsey, in places along the Waveney and sporadically at scattered sites in other river valleys and further inland to the north-west of the county (Ticehurst 1932). Many of these smaller colonies no longer exist, mainly through destruction of habitat and collecting in the last century, but each of the large coastal reed-beds now holds good numbers, especially at Walberswick, and, as in Norfolk, smaller sites have been recolonised as a consequence of the present series of eruptions. At Minsmere, now one of the main breeding sites and second in importance to Walberswick, breeding was first observed by G. Dent in 1938.

Local wandering from these East Anglian strongholds and appearances in non-breeding areas in late autumn and winter have long been known, J. D. Hoy writing in 1830 that Bearded Tits were dispersed in autumn and winter throughout the coastal reed-beds. More recently, W. Vincent, of Hickling, who noted the regular dispersal of Bearded Tits in hard winters, sometimes to places as distant as 50 miles away, recorded a wholesale disappearance of local birds from east Norfolk in 1940 and thought that the majority had been pushed further south by

the severe winter (Alexander, Tucker and Brown 1949). Then, after the birds 'had recovered astonishingly well after two of the worst seasons ever remembered for them', Vincent found a stock of at least 100 adults and juveniles at the end of the 1941 season at Hickling, whilst A. Buxton recorded a party returning to Horsey in October after none had bred in that parish (*Wild Bird Protection in Norfolk*, 1941: 10 and 13). It was in the ensuing winter, perhaps significantly, that Gregory saw the 100 in east Kent.

During these earlier movements, there had been remarkably few recorded observations of autumn high-flying such as has been regular in these areas since 1959. A. Buxton (*Wild Bird Protection in Norfolk*, 1951: 13) recorded a small group at Horsey in early October which flew straight up to a considerable height—behaviour which he had seen only once several years previously. In 1955, a good year, the same author saw a party at Horsey fly up to a great height and eventually go beyond his sight, but then return to their starting point.

North of East Anglia, there is only one record for Nottinghamshire, of a bird near Toton in about 1880 (A. Dobbs *in litt.*), and the first occurrence in Rutland was of two males shot at Burley Ponds on 18th January 1905 (Haines 1907). Lilford (1895) stated that he heard the species in Northamptonshire on the River Nene in September 1848 or 1849. In Lincolnshire, where the birds used to breed, two seen at Gibraltar Point on 27th September 1956 were the first occurrences in the county for over a century (A. D. Townsend *in litt.*). The most northerly of the breeding sites was in Yorkshire where a pair once built at Walton Hall and a pair was seen with young at Hornsea Mere on 28th June 1901 (Nelson 1907). At the latter site, six pairs and two males were liberated on 11th April 1911 and, although some breeding took place, the experiment failed, the last bird being seen on 30th September 1916. The next occurrence in the county was of three at Ingleby Barwick on 6th and 7th December 1948 (Chislett 1953), then none until the eruptions began from East Anglia and small numbers appeared at Spurn Head and Hornsea between 17th and 20th October 1959 (*Yorks. N.U. Ornithological Report*, 1959).

MOVEMENTS ON THE CONTINENT BEFORE 1965

Long-distance wanderings of west European Bearded Tits do not appear ever to have been recorded on a scale comparable with the recent emigrations from East Anglia, and the great explosion of Dutch birds in 1965 is thus also without known precedent.

Migratory behaviour on the Continent was instanced by Dresser (1871) who said, 'With us in England they are residents, but on some parts of the Continent, according to Naumann, they are partial migrants, owing chiefly to the reeds where they are found during the summer drying up or being cut down to burn; and he states that their migra-

tions take place during the night. In the vast fen district of Holland, where they are most abundant, they are residents and are found chiefly near the salt water.' On an earlier page, Dresser quoted Professor Schlegel as saying of the Dutch population, then found chiefly to the eastward of Rotterdam, that the birds were migrants, leaving in October and returning in April; he also quoted de Selys-Longchamps as recording it as accidental in Belgium 'during the autumn migration' and de la Fontaine as observing that it visited Luxembourg in winter, generally in November.

The eastern race *P. b. russicus* appears to be more regularly migratory than typical *biarmicus*, perhaps as a result of its breeding areas becoming untenable in generally severe winter weather and because the vegetation there is regularly cropped or burnt. Azerbaidzhan birds make regular long distance migrations, and late autumn appearances on the shore of the Apsheron Peninsula (ENE of Baku) are annual (Tuaev and Vasiliev 1965). In Austria, fluctuations of the Neusiedlersee colony have been summarised by Spitzenberger (1963) who stated that an autumn southerly movement occurs and that birds are found in distant places between October and February. H. Steiner (*in litt.*) considers that the movements may depend upon population density there and he found it difficult to say in years of low numbers if any Neusiedl birds moved away or not; 1965 was a poor breeding season and no increased migrational behaviour was observed in the autumn. An outstanding example of long distance movement by a Bearded Tit was of one ringed at Neusiedl in September 1954 and recovered near Rome, 460 miles away, in the following December.

In Cyprus, the Bearded Tit is a scarce winter visitor in late November to mid March (*Cyprus Orn. Soc. Bull.*, 15: 32) and has occurred singly or in groups of up to twelve in five winters between 1956 and 1965 (*Cyprus Orn. Soc. Reports* and F. J. Walker *in litt.*). It is not known to breed on the island (Bannerman and Bannerman 1958 and G. F. Rivers *in litt.*). Bannerman and Bannerman recorded five being caught there, on lime, in September 1942.

Another bird exceptionally far from the nearest breeding site was seen in Vanhankaupunginlahti Bay in Helsinki on 20th November and 6th December 1949 (Merikallio 1958). The species has bred from time to time in Lithuania, but in north-east Germany it is very scarce (1-100 pairs classification) (Niethammer, Kramer and Wolters 1964) and in Denmark it has only been a rare visitor from the south. In the light of recent proof of the ability of Dutch birds to make long overseas journeys, the claim of six occurrences on Heligoland in the last century (Gätke 1895) may be given proper credence. In recent times, other movements overseas, in addition to those between the Netherlands and Britain, have occurred into Norderney, in the East Frisian Islands, in October 1963 and October 1964; in the latter case, some stayed through-

out the winter and formed a small, new breeding colony in 1965 (see also page 526).

THE DUTCH COLONIES

During this century, populations in the north-west of the Netherlands have been much affected by the artificial creation, and then part-destruction, of vast new reed-beds, as large areas of the IJsselmeer (the former Zuider Zee) have been reclaimed and, by stages, drained and ploughed to make new agricultural land. In the old reed-beds of the Naardermeer reserve, the species had ceased to breed numerously in the early 1920's, but just before World War II at least 300 pairs were nesting in the Netherlands, mostly in the great reed-beds along the east side of the IJsselmeer. Then in 1945, after the water level had been kept too high by the Germans, they moved to the new reed-beds of the newly-reclaimed Noordoost polder where they bred well in the years 1946-48; some hundreds were seen moving along the coast, mostly eastwards, but also south-westwards in 1948 (ten Kate 1950). Following the reclamation of this area, numbers fell considerably and some were thought to have moved to the near-by Zwartemeer. There, despite near-catastrophies due to high water in 1950 and 1953 (Berg 1955), the colony increased to 220 pairs, with about 600 fledged young, in 1961 (Dr. M. F. Mörzer Bruijns *in litt.*); 300 were ringed that year, but produced no distant recoveries (J. A. F. Koridon in discussion). The *Avifauna van Nederland* check-list still gave the Bearded Tit as only a scarce breeding bird (i.e. not more than 250 pairs) in 1962, but by then another, greater breeding area, in Oost Flevoland, was becoming suitable. This vast new polder, separated during 1950-56, was sown with reeds from the air when it contained much soft mud. Now, especially in the northern and western quarters, it has reed-beds extending over 100 square kilometres. In this enormous area of suitable breeding habitat it has been impossible to assess numbers. It is known that Bearded Tits were present in 1960 and were breeding in some numbers in 1961, soon reaching an estimated 200 pairs (ten Kate 1963 and 1964). Overcoming the set-back due to the great frost of early 1963, this new colony then increased rapidly and had a remarkably successful season in 1965. In August and September of that year, Dutch ringers were surprised to catch some 2,050 Bearded Tits; one mist-net operator at one site ringed 881 in twelve days between early August and late September, obtaining only 5% retraps (B. J. Speck *in litt.*). In recent years, before 1965, only some few hundreds were ringed annually in the Netherlands (Perdeck 1963, Perdeck and Speck 1964, 1965). When 2,000 had been ringed there in August and September 1965, only 10% of the ringed birds had been retrapped in the same areas and it was considered by many Dutch ornithologists that the autumn population had in fact reached an unprecedented total of some 20,000 individuals (K. Zweeres *in litt.*).

DISTANT MOVEMENTS OF DUTCH AND PRESUMED DUTCH BIRDS
IN AUTUMN 1965

From the beginning of October 1965, flocks of Bearded Tits began to be seen outside the breeding areas all along the Dutch coast from the Frisian Islands down to Walcheren (F. Bloem *in litt.*) after 'an explosion, particularly from Oostelijk Flevoland' had occurred (Zweeres 1965). Such an eruptive movement had not been seen on anything approaching this scale before, although, as already noted, unusual numbers had been recorded moving along the coast in the autumn of 1948 (ten Kate 1950) and excited activity and distant wandering were observed in 1964. In Belgium, at the end of September 1965, Bearded Tits began to appear near Antwerp where the last Belgian birds had bred in about 1870 and later they were seen all along the coast in flocks of up to 30, inland at Ghent and even as far as Leuven, about 25 kilometres east of Brussels. Before these occurrences, the species had been a scarce vagrant to Belgium in late autumn: 44 ringed in the late autumn of 1965 were probably the first ringed in that country (P. Houwen *in litt.*). Bearded Tits were also seen on the move near Hanover and in the East Frisian Islands, Germany.

In France, Bearded Tits were recorded in Pas-de-Calais, Somme, Gironde, Seine-et-Oise, Manche and Loire-Atlantique in October and November, including concentrations of 50-100 in the latter three of these departments, and in Finistère, Vienne and Gironde in the winter of 1965/66 (Erard 1966, Ferguson-Lees 1965); thus the species reached as far south and west as the area of Bordeaux. In the Channel Islands, there were at least five on Jersey on 24th October, and one on Guernsey during 20th-24th November provided a first record for that island. Another first record, this time for Ireland, arising from these remarkable movements of Dutch Bearded Tits (or perhaps British ones in this case) involved two near the coast of Co. Louth on 3rd January 1966 (see also page 528); the old Irish specimen from the Shannon included in Yarrell (1837-43) was rejected by later authors.

As already noted, seven of the Bearded Tits ringed in the Netherlands in the autumn of 1965 were trapped in England and Wales, and were the first recoveries across the sea. Equally, if not more, remarkable was the male ringed at Stanpit, Christchurch Harbour, Hampshire, on 21st October 1965 and recovered on 20th August 1966 at Westbeverkoog polder, near Oudorp, Noord Holland, where it had probably bred. This bird was one of 26 trapped out of over 30 present in the Stanpit marshes in the latter half of October 1965 (see also page 526) and presents the possibility of a Bearded Tit having made a true migratory movement both ways over the sea.

EVIDENCE OF IMMIGRATION BEFORE 1965

Before the arrival in Britain of Bearded Tits from the Continent was

proved by the control of Dutch-ringed individuals in 1965, many of the autumn occurrences of groups in south-eastern coastal areas of England were readily attributed by various authors to immigration. Whilst now, with hindsight, it can be said that some at least of these coastal groups possibly were immigrants, the evidence was quite meagre. Professor Dr. K. H. Voous informed me in 1962 that there had been no reported occurrences at Dutch lights or ships. Nor have there been any records from British fishing craft, light-vessels or light-houses covering the southern North Sea and the eastern Channel, with the one possible exception of a single Bearded Tit at Languard Light, Suffolk, at 07.40 on 16th February 1887 (*British Association Reports*, no. 9). Ticehurst (1932) could hardly credit this occurrence, presumably as a night-migrant attracted to the light. For lack of corroborative evidence, too, Rivière (1930) could not accept a note in the same 'Migration report' of a flock at Great Yarmouth on 13th November, which was said to come in 'from a great height from the east' (i.e. from the sea). Dresser (1871-90), whilst recording that in the Netherlands the Bearded Tit was partially migratory and that a south or south-west movement across Belgium, Germany and France was normal in autumn in the middle of the last century, quoted Stevenson as having no reason to suppose that the East Anglian stock was replenished by Continental migrants.

The hundred Bearded Tits seen by Gregory (1942) in Kent in 1941, referred to earlier, were considered by many to have been Continental immigrants. But in the Netherlands then the population had decreased considerably because of severe winter weather (ten Kate 1950) and there were neither large-scale movements south-westwards in that country nor irruptions into Belgium and north France, as occurred in autumn 1965.

In October 1912, and again in 1916, J. K. and H. M. Stanford saw small parties at Thorpe Meare, on the Suffolk coast, which, from their behaviour, appeared to be new arrivals in an area where none bred (Payn 1962). Buxton (1950) recorded that 'some years ago', in Suffolk, a flock came over the sandhills from the direction of the sea and flew into the reed marsh and that in August 1948 a group arrived at another coastal reed-bed where none had bred. One observation which several authors were to use as support for the immigration hypothesis was by H. G. Alexander who saw, on 16th October 1948, a compact group of ten shoot down out of the sky into a coastal reed-bed at Cley, Norfolk (Alexander, Brown and Tucker 1949). None had bred at this site that year and the report on Cley in the *Transactions of the Norfolk and Norwich Naturalists' Society* for 1948 says that a Bearded Tit was first seen there on 11th October and that a week later 14 were counted; these were 'believed to be overseas birds as those (few) which bred in other parts of the county remained in their nesting areas.' A few weeks later, on



PLATE 74. Male Bearded Tit *Panurus biarmicus* straddling two reeds in typical fashion, Norfolk. The East Anglian population has erupted each winter since 1959 and in 1965 some Dutch ones came to Britain (pages 513-543) (photo: Eric Hosking)





PLATE 76. Hen Bearded Tit *Pannurus biarmicus*, Norderney, East Frisian Islands, 1965. This island was first colonised in 1965 following the arrival of parties in autumn, perhaps from the Netherlands, in 1963 and 1964 (photo: Manfred Temme)

75 (opposite). Upper, eruptive group of Bearded Tits *Pannurus biarmicus* up to leave the reed-beds at Minsmere, Suffolk, September 1961 (photo: osking). Lower, party of juveniles, Norderney, 1965 (photo: Manfred Temme)



PLATES 77 and 78. Above, male Bearded Tit *Panurus biarmicus* at nest (photo: Eric Hosking); below and opposite, female and male (photos: John Markham). These pictures show the male's black moustaches, the female's unmarked head (sometimes streaked on crown), both sexes' distinctive wings and the nestlings' tongue spots







PLATE 79. Semipalmated Sandpiper *Calidris pusilla*, Kent, September 1965. Note the small size compared with the two Dunlins *C. alpina* in the upper photo; the stint-like shape, but with longer legs and stouter bill; the 'scalloped' back; and the smudges at the sides of the breast (pages 543-547) (photos: Pamela Harrison)





PLATE 80. Two hybrid Grey Lag *Anser anser* x Canada Geese *Branta canadensis*. Above, white-headed type, Cumberland; below, intermediate type, Kent. The white head recalls a blue-phase Lesser Snow Goose *A. c. caerulescens* and the significance of this striking feature is discussed on pages 547-550 (photos: Pamela Harrison)





PLATE 81. Above, Water Pipit *Anthus s. spinoletta* wintering at watercress bed, Hertfordshire, 1966—dark above and off-white below with an upright posture (pages 552-554) (photo: I. G. Johnson). Below, Water Pipit in summer, Italy, 1953; note supercilium and near-immaculate sides to breast and flanks (photo: R. Vaughan)



28th November, D. H. Brown saw four Bearded Tits on the Crumbles, near Eastbourne, Sussex: these stayed throughout the winter and were last recorded on 14th March 1949. During that same autumn of 1948, parties of Bearded Tits moved south-west along the Dutch coast to what was then a most unusual distance from their breeding sites and this movement was cited by ten Kate (1950) as more support for the hypothesis that Alexander's and Brown's birds were of Dutch origin. So also, of course, may have been Buxton's in the same autumn, although August would have been remarkably early for such an occurrence.

Observations of behaviour which might equally well have been used in the argument for immigration were communicated to me by R. A. Richardson. At Cley, at about noon on a day in November 1950, he saw two birds come low over the shingle ridge from the direction of the sea and disappear into the first patch of reeds. At the time there was complete cloud cover and a fresh wind and the behaviour of Bearded Tits in such conditions is in contrast to recent local, inter-marsh movements during which parties usually arrive from a good height and drop vertically into the reeds, almost invariably in quite quiet weather. On 15th October 1961 Richardson saw two Bearded Tits which appeared to come over the sand dunes at Blakeney Point, near Cley, the first record for the species at this site on the coast.

My own observations during the last eight 'eruption' years, 1959-66, together with those of the Dingle Bird Club at Walberswick, have produced many instances of high-flying at the coast. Scores of times have I seen parties drop down into the reeds from high over the dunes at the coast and, had I not observed their original take-off from the marsh and their return after a movement down the coast, I might well have suspected an arrival in from the sea.

DISCUSSION

The occurrence in Britain of a series of eruptions of Bearded Tits comparable in scale with that of 1959-65 is not evidenced in the records over about the previous 150 years. If these eruptions are a response to unusually high autumn densities in the breeding areas, then the infrequency and small scale of the earlier movements could be attributable to the small size of colonies lacking the stimulus of autumn crowding in what were then larger reed-beds. They also suggest a much higher population in Britain in the past eight years. But such a present satisfactory state should be seen against the small total of earlier records left by the few collectors and observers, who appear generally to have failed to note the size of breeding colonies in the early 1800's, compared with the efficiency of the present-day net-work of recorders and field-workers. It is reasonable to suppose that the comparatively few earlier records of Bearded Tits at long distances from the known breeding

sites did in fact arise from occasional periods of high population.

The excited activity shown by the big numbers in the autumns of recent years may be compared with that of the tits *Parus spp.* which erupted in 1957 when a large autumn population had resulted from a good breeding season following a high rate of survival in a previous mild winter (Cramp, Pettet and Sharrock 1960). Exceptional behaviour on the part of the Bearded Tits included such activities as perching on the tops of tall trees, moving through thick woodland and fluttering against glass. As well as being stimulated to make long journeys, as were the Bearded Tits, some of the erupting *Parus* tits also displayed extraordinary excitement, Blue Tits *P. caeruleus* especially showing this in their pecking of putty in windows, entering houses and tearing wallpaper.

Comparison may also be made with the behaviour of such well-known and more frequent invaders as the Waxwing *Bombycilla garrulus* and the Crossbill *Loxia curvirostra* which erupt, irregularly, in response to annual food fluctuations. These are specialist feeders in autumn and winter, their search for new food sources sometimes carrying many of them to places well beyond their normal range. Bearded Tits are also specialist feeders in that their foods—insects and their pupae and small molluscs—are found practically only in freshwater marshes with extensive cover of *Phragmites*, the seeds of which they may also eat. Their search for such habitats, now fewer and widely scattered in Britain, has required wandering over long distances and their excited restlessness, originating from crowding in the home reed-beds, appears to have been maintained for many weeks, causing groups to move on from one small, newly-discovered reed-bed to search for another.

The occurrence of crowding in the breeding areas was suggested by Lack (1954) as the proximate stimulus for the invasion type of migration, excitement and restlessness being produced and giving rise to emigration before food became scarce. In the case of the dispersal of high densities of Bearded Tits, there is evident survival value in decreasing any unusual pressure upon highly localised food sources and discovering new, untenanted habitats.

Discussing the application of Lack's hypothesis to the invasions of Waxwings, Cornwallis (1961) said that, in seasons when population is at a low level, the stimulation to emigrate is absent and emigration is a direct response to failing food supply. This part of the argument has been seen to be less readily applicable to the recent eruptions of Bearded Tits, valid as it may be in the cases of other species which are not true migrants. Whilst it may be true that East Anglian populations are higher now than for very many years, they were much reduced in 1963 after a severe winter and yet considerable excited activity and emigration still occurred in that autumn. Outside East Anglia, emigrations also took place from very small breeding colonies of five to ten

pairs in newly-adopted reed-beds where over-severe pressure upon food supply could not have arisen.

Further, at Minsmere, not more than 40 pairs have bred during any of the recent eruption years in 400 acres of reeds and shallow, stagnant water where a good food supply is apparent from the annually large wintering population of Blue Tits and Wrens *Troglodytes troglodytes*, the former feeding on insect pupae in reed stems as do Bearded Tits when these stems become broken or are cut. Such intra-specific competition for food is a normal experience for Bearded Tits in winter; but it does not occur to any important extent before their period of eruptive activity from mid-September to late October. Bearded Tits are not territorial, ranging widely for food within one large reed-bed, and up to 40 pairs with a total of some 320 fledged young after a good season could perhaps result in overpopulation in the winter, so that there would be survival value in dispersal to new reed-beds. But at Minsmere in the autumn of 1963, when quite strong eruptions still occurred, there were only 18 pairs with no more than 150 fledged young, a density as low as in some of the non-eruptive years before 1959.

Svårdson (1957) suggested that the onset of invasion migration is stimulated by the same proximate factors as those which start the movement of true migrants, i.e. the internal physiological state of the birds and the immediate environmental conditions; both types of migrants move every autumn, invasion species stopping to exploit newly-discovered food sources whilst true migration continues towards winter quarters which are constant in location. Such an hypothesis is in accord with the autumn behaviour of the Bearded Tit, although some of the other characters of invasion migrants listed by Svårdson—for example, having a fluctuating breeding range and being retarded from emigrating from the breeding area by abundant food—are not strong in the species. In East Anglia, regular autumn movement to untenanted reed-beds, involving journeys of up to 50 miles, has long been known, while a local 'exchange' of reed-beds outside the breeding season has been indicated by ringing. During their recent journeys, many groups were halted by, and some overwintered in, suitable habitats which they had discovered at varying distances from their home area.

Whilst Lack and Svårdson suggested different proximal causes for invasion migration, support for both hypotheses is seen in the eruptive behaviour of Bearded Tits. Recent emigratory activity in very small and new populations, supporting the latter but not the former author, may have been by individuals which had retained, and whose young had inherited, such behaviour.

A high rate of reproduction is possible in areas of low density and the species is evidently subject to huge and rapid increases, given a few seasons of favourable weather (see table 1). Ringing recoveries

indicate an ability in at least some of the long-distance wanderers to make return journeys and suggest that this north-westerly population, so long regarded as non-migratory, is potentially capable of avoiding severe winters. Survivors, by emigration, of near-catastrophic decreases caused by severe winters or floods in the home area, having some migratory tendency and migratory progeny could quickly produce a migratory population regulated by the 'suicidal' proportion of emigrants which failed to find sufficient food. Ringing in the breeding sites shows that both first-year birds and adults are involved in the eruptions, but our present inability to age this species in winter makes it impossible to say from recoveries at distant points whether there is a preponderance of young birds in the movements.

The British and Dutch Bearded Tits are on the extreme north-west border of their range. The possibility that the recent movements may be in response to the breeding areas becoming climatically unfavourable is not supported by the relatively sudden occurrence of this period of long-distance movements nor by the birds' continued success in their old established breeding areas. Indeed, in recent years which have included some very severe winters, the total population in England has shown a substantial increase, while in the Netherlands the birds have remarkably successfully exploited the larger habitats becoming available as a result of the reclamations of the IJsselmeer. Very few pairs showed any attempt to spread the species' range by breeding in the large, newly-discovered habitats, distant from East Anglia, to which their emigration had taken them.

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SUMMARY

A rapid increase in the British population of Bearded Tits *Panurus biarmicus* has taken place in recent years, including a remarkable recovery from apparently near-extinction in 1947. In this connection, records of earlier distribution in Britain are reviewed. Eruptions began in the autumn of 1959 after a highly successful breeding season and have continued each year since then. Enigratory activity was studied at Minsmere, Suffolk, in the autumns of 1959-65. In this period, there were many occurrences at distant places, including counties in which the species had not hitherto been recorded (figs. 1-7).

Apparent movement in pairs and return migration to breeding sites are indicated by ringing recoveries (fig. 8). Reference is made to the huge build-up of the Dutch population in 1965, the resulting eruption and the first proven occurrences of Dutch birds in Britain. Evidence for the hypothesis that British stock had earlier been augmented by Continental immigrants is reviewed. Eruption activity of Bearded Tits, with high numbers as its proximal cause, is compared with that of tits *Parus spp.* and other invasion species.

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Semipalmated Sandpiper in Kent and the problem of identification

By *W. F. A. Buck, A. J. Greenland*
Jeffery G. Harrison and R. E. Scott

Dungeness Bird Observatory

(Plate 79)

THE SMALL American *Calidris* waders are notoriously difficult to identify, particularly by anyone lacking in experience of the group (see, for example, Nisbet 1963 and Marchant 1963). Between 6th and 9th

September 1965, what eventually proved to be a Semipalmated Sandpiper *C. pusilla* was present on a gravel working at Dungeness, Kent. During and after its stay the bird caused a considerable amount of confusion, but fortunately, on 7th September, Dr. Pamela Harrison obtained an excellent series of photographs of it in company with Dunlin *C. alpina*. These photographs, two of which are reproduced on plate 79, eventually resulted in a positive identification.

It is hoped that this short paper, which we trust contains a true record of what occurred, will prove helpful if only to emphasise the dangers and difficulties in identifying these birds, and to show how an observer with previous experience of a particular species can be sorely missed.

On the evening of 6th September 1965, A.J.G. located a small flock of waders on the sands of the Amalgamated Roadstone Company's gravel working at Dungeness; this consisted of some half-a-dozen Dunlins, a Little Stint *C. minuta* and a stint-like wader which he was unable to identify. He immediately fetched R.E.S., but the species was unfamiliar to him also and in the evening light it proved difficult to obtain an accurate or comprehensive description. However, A.J.G. and R.E.S. agreed that the bird came between the Dunlins and the Little Stint in size; that it was longer-legged and longer-billed than the Little Stint with a marked whitish appearance at a distance, which easily served to pick it out; and that it had a very scalloped or scaly appearance to the upper-parts.

The following morning, 7th September, R.E.S. returned to the site at first light and was able to obtain a series of field-notes. He thought that the bird might be a Western Sandpiper *C. mauri* or a Semipalmated. It was then watched by a party consisting of A.J.G., R.E.S., Mr. and Mrs. P. J. E. Bernard, R. C. Homes, P. Kinnear, R. D. Oades, Mrs. H. A. N. Scott, J. Swift and Mr. and Mrs. P. J. Wilson. Unfortunately, none of these observers was very experienced with American waders. The consensus of opinion was that the bird looked 'different' and that it was closest to the Little Stint in appearance.

Later in the morning of the 7th, after unsuccessful attempts at trapping the bird had been abandoned so as not to disturb it too much, J.G.H. visited the site with his wife, Dr. Pamela Harrison, and W.F.A.B. They watched the bird for some two hours in company with Dunlins (the Little Stint had been trapped and taken to the observatory). During this period Pamela Harrison obtained a series of some 70 photographs. After watching the bird for some time, W.F.A.B. stated that he considered it to be a Baird's Sandpiper *C. bairdii* and J.G.H. concurred. They informed the other observers of their identification which resulted in further discussions, the outcome of which was that R.E.S. agreed but some of the other observers seemed uncertain.

The bird was still present on the 8th, when it once again avoided capture and eventually departed early on the morning of the 9th.

During the following days, descriptions of the bird as a Baird's Sandpiper were given to R.E.S. by W.F.A.B., A.J.G., J.G.H. and R.D.O. and the following is a compilation of the notes of these five observers:

(General appearance, size and shape)

A pale, whitish stint-like wader, with active feeding movements. Between Little Stint and Dunlin in size, but whole appearance more stint-like than Dunlin-like.

Bill straight, comparatively longer and thicker at base than Little Stint (R.E.S.); about the same length as Little Stint, perhaps very slightly longer (W.F.A.B., J.G.H.). In flight the bird gave the effect of a more down-pointed bill than the stint. Legs comparatively longer than Dunlin; and stance reminiscent of a dwarf Curlew Sandpiper *C. ferruginea* (W.F.A.B., J.G.H.). Wings at least as long as tail when bird standing, but it was impossible to say that they were longer. A long-winged effect in flight, somewhat reminding R.E.S. of a White-rumped Sandpiper *C. fuscicollis* in Sussex in 1959.

(Description)

Crown dark, contrasting with the pale superciliaries which became slightly more prominent behind the eyes and which joined at the forehead to present a rather capped appearance. Nape grey, but streaked and noticeably contrasting with the crown, which again enhanced the capped appearance. The nape colour shaded into a more uniform area of the lower neck and upper mantle between the shoulders. A slight trace of orange-buff speckling immediately behind the eye (R.E.S.).

Very prominent white edgings and tippings to the scapulars and wing-coverts, which admixed with the warm buff and black to present a marked scalloped or scaly effect to the upper-parts, also prominent on the wing-coverts in flight (R.E.S.); the pale sepia centres sharply outlined in white or pale chestnut (W.F.A.B., J.G.H.); scaly with mosaic of silver and buff feathers (R.D.O.); effect rather similar to Red-necked Phalarope *Phalaropus lobatus* (A.J.G.). Greater coverts slightly tipped white, which produced a slight wing-bar in flight, but this was far less pronounced than in either Dunlin or Little Stint and did not appear to extend to the base of the primaries. There was no suggestion of any V-markings as in juvenile Little Stint, and the only longitudinal markings were formed by the contrasting edges of the long scapulars.

Tail uniform and dark in flight, showing no contrast with rump, although white under tail-coverts produced effect of white sides to upper tail-coverts in flight (R.E.S.); no white outer tail-feathers, only whitish side patches (A.J.G.); no contrasting tail pattern as in the young Dunlins (W.F.A.B., J.G.H.).

Complete buffish pectoral band, which contrasted with a clear, paler throat. Slightly darker speckling on breast band was more prominent at the sides. Pectoral band stopped slightly below the closed wing which showed a trace of clear white from the under-wing. In some positions the white tended to extend in front of the shoulders to give a crescent effect, but not so marked as in a Common Sandpiper *Tringa hypoleucos* (W.F.A.B., J.G.H.). Remainder of under-parts much whiter than in Little Stint.

Soft parts: eye, bill, legs and feet all dark (R.E.S.); beak and legs blackish (W.F.A.B., J.G.H.); bill black, legs very dark or black (R.D.O.). Legs appeared slightly paler than Dunlin's in very good light (R.E.S.).

Voicc: *peep*, not soft, but completely lacking any harsh quality (R.E.S.); a single *peep* sometimes uttered several times (W.F.A.B., J.G.H.); *cheep* (R.D.O.); *peep* (A.J.G.).

Light conditions were variable during the bird's stay, from excellent to torrential rain. Observations were made down to two or three yards with binoculars.

In early October copies of the observers' descriptions and a selection of photographs were sent to the *British Birds* Rarities Committee, which accepted the record as a Semipalmated Sandpiper after sending the photographs to the United States for comment (see below).

In retrospect, having learned the bird's true identity (all of us now concur that it was a Semipalmated Sandpiper and withdraw our earlier incorrect claim of a Baird's), we find it rather difficult to re-examine the record from a detached viewpoint and see exactly why we considered the bird a Baird's.

Undoubtedly a key factor was that the identification books we consulted stressed the scaly appearance of the upper-parts in Baird's—a feature that all observers agreed was striking in this case. However, Hollom (1960) wrote, 'The smaller Semi-palmated and Western Sandpipers can look scaly-backed and sometimes slightly buffish on breast. . . .' We examined the note by Browne (1958) on the identification of Baird's and considered that his three points—scaly upper-parts, slenderer bill and well streaked breast band—fitted our bird in all but the last character and it became debatable as to what was meant by 'well'-streaked. Two features noted should have eliminated Baird's—wings not projecting beyond tail, and presence of a wing-bar in flight. At this time W.F.A.B. had been handling numerous Dunlin which had not completed their wing moult, the longer outer primaries not being fully grown. We considered it possible that our wader might also have had short wings because of unfinished moult, although moulting times given in *The Handbook* would not agree with this. Although several of the identification books stated that Baird's lacks a wing-bar, both Fluke (1953) and Boyd (1955) mentioned a slight wing-bar on birds seen in Norfolk and Cheshire.

James Baird of the Massachusetts Audubon Society (*in litt.* to the late D. D. Harber) summarised the position well having seen the photographs and descriptions:

'Reasons why it is not a Baird's: (1) wings do not project beyond tail, which they do in most, if not all, Baird's; (2) the bird lacks a well-defined, narrowly-streaked breast band; (3) small size—the Baird's is "medium-sized" and would have been closer to the size of the Dunlin; (4) the scalloping effect on the back and wings is much too strong for a Baird's, which has a more scaly effect rather than scalloped. In addition, the scaly pattern of the Baird's is essentially restricted to the back and is not especially noticeable on the wing-coverts.

'Reasons why it is a Semipalmated: (1) small size; (2) blackish bill and legs, plus length of the bill; (3) the strong edgings to the feathers of the back and wings which are characteristic of immature Semipalmateds; (4) the buffy suffusion across the breast terminating on either side in a more strongly marked patch is also a characteristic sign of immaturity; (5) although not apparently obvious to some of the observers, the photos show the two white streaks down the back, which the Baird's lacks.'

In general, the autumn of 1965 was not an outstanding one for American waders in Britain and most of those recorded appeared in the first half of August or after mid-September. There was, however, the usual scattering of Pectoral Sandpipers *C. melanotos* throughout the autumn, and in the first week of September a Baird's Sandpiper was seen in Suffolk from the 4th and a White-rumped Sandpiper in the Isles of Scilly from the 6th.

This is only the fourth British record of the Semipalmated Sandpiper, the previous three having been in Norfolk (July), Fife (September) and Pembrokeshire (July). It may be of interest to add that the now rejected 'Hastings' record was in Sussex in September.

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Hybrid Grey Lag $\times$ Canada Goose suggesting influence of Giant Canada Goose in Britain

By James M. Harrison and Jeffery G. Harrison

(Plate 80)

IN THE SPRING of 1962, at Millom, south Cumberland, a male Grey Lag Goose *Anser anser* mated with a female Canada Goose *Branta canadensis*. The Canada Goose, which was perfectly normal in all its plumage characters, had flown in to join a flock of Grey Lags maintained in a reserve at Millom by the Wildfowlers' Association of Great Britain and Ireland (W.A.G.B.I.). Only one of the resulting hybrid offspring reached maturity. This goose remained in south Cumberland in company with the W.A.G.B.I. Greylags. From the first, it presented some remarkable plumage characters.

In 1965 a second hybrid family was reared, this time on the

W.A.G.B.I.-Wildfowl Trust Experimental Reserve at Sevenoaks, Kent. Although the direction of the cross was the same, the two hybrid types were quite distinct and it was therefore decided to collect the Cumberland bird and one of the Kentish ones for study.

DESCRIPTION OF CUMBERLAND HYBRID

This bird, an adult female, was examined on 12th January 1966 and the following description taken (see also plates 80a and 80b):

Head and neck: white with forehead sparsely and irregularly spotted with black; crown, nape, back and sides of neck increasingly streaked with black; sides of face white with very few obscured spots; chin white; lower neck adjacent to mantle dark chocolate-brown, slightly paler in front. *Upper-parts:* mantle feathers sepia, edged with ash; rest of back and long scapulars increasingly dark; rump and central tail-coverts uniform dark sepia; rest of tail-coverts white; rectrices dark sepia, narrowly tipped with ash. *Under-parts:* breast greyish-ash, mottled with sepia, becoming paler over lower breast and belly; flanks dark brownish sepia, barred with ash; under tail-coverts white; two outer pairs of rectrices dark sepia with proximal halves of medial vanes whitish, lateral vanes and tips pale grey; rest of tail-feathers dark sepia with diminishing greyish tips lacking on central pair. *Wings:* lesser coverts greyish-sepia, narrowly barred with ash; median and greater coverts greyer; alula grey; secondaries dark sepia, narrowly edged with pale ash; primaries greyish-sepia merging into blackish-sepia. *Soft parts:* iris brown; bill flesh-grey with culmen pale lemon-yellow, nail dark horn; tarsi and toes pale flesh-pink; webs slightly darker and mottled; nails horn. *Measurements:* wing 465 mm.; tail 150 mm.; tarsus 71 mm.; bill 56 mm.

DISCUSSION

The second hybrid, which is in immature plumage, is not described in detail here because its main interest is for comparison and this is achieved by the photographs on plates 80c and 80d. It must be emphasised again that the direction of the cross was the same as in the Cumberland case, i.e. male Grey Lag $\times$ female Canada Goose. Yet this bird is quite different from the other. It is intermediate between the two species, with Canada goose features dominant, and shows no marked character which is divergent. On the other hand, the Cumberland hybrid presents a strikingly divergent character in the white colour of the head and neck; this difference was already present in its juvenile plumage.

The appearance of such a remarkable character brings one to consider the significance of its origin. Hanson (1965) stated that the Giant Canada Goose *B. c. maxima* frequently shows an increase of white on the head to such an extent as to give it a superficial resemblance to a Barnacle Goose *B. leucopsis*. Furthermore, he illustrated examples in which the white extended the whole way down the neck with a streaked appearance as in this hybrid.

There is another hybrid on record in which the white head and neck was a striking character. Bailey and Niedrich (1960) illustrated a

family of white-headed geese at Denver, Colorado, accompanied by a Canada Goose and a Snow Goose *Anser caerulescens* which were regarded as the probable parents. These offspring were remarkably similar to the Cumberland bird and were at first identified as blue phase Lesser Snow Geese *A. c. caerulescens*.

What is the phylogenetic significance of this white-headed character? We have shown elsewhere that interspecific hybridisation among wildfowl frequently exposes characters other than ones which can be considered intermediate between the two parent species; in fact, these often resemble those found as normal characters in other species, thus providing evidence of evolutionary significance (Harrison 1953, Harrison and Harrison 1963). This phenomenon is particularly well illustrated in certain *Aythya* hybrids, a good example being the 'Lesser Scaup' type of hybrid from male Tufted Duck *A. fuligula* x female Pochard *A. ferina*. A second instance is the 'Paget's Pochard' or 'Ferruginous Duck' type produced by male Pochard x female Ferruginous Duck *A. nyroca*, while the Tufted Duck x Ferruginous Duck gives rise to a 'Baer's Pochard' type (Gillham, Harrison and Harrison 1966). Such hybrids have presented identification problems in the field. Similarly, the white-headed hybrid goose could easily have been mistaken for a blue-phase Lesser Snow Goose.

These hybrids which resemble species other than those involved in their parentage raise the possibility of reticulate evolution as a factor in the speciation of wildfowl. This theory suggests that a new species may develop from a group of fertile hybrids breeding among themselves. Whatever views one may hold about such a theory, there seems little doubt that the white head and neck in the Cumberland bird were derived from a recessive gene which had become dominant in the hybridisation. This suggests that some Giant Canada Goose ancestry was present in the female Canada Goose in Cumberland, and not in the one in Kent.

Is it possible, therefore, that at least some of the Canada Geese introduced into Britain over 300 years ago were Giant Canada Geese? This race had long been thought to be extinct until its rediscovery in 1962. Hanson has now described it in detail. Apart from its great size, it has a number of distinguishing features. Thus it generally has very pale under-parts, which may appear almost white in flight. There is also a hook-like extension to the white 'cut throat' marking at the upper end of its posterior edge. Both of these features occur in some of the Canada Goose flocks in Britain today. Of 60 Canada Geese studied in the field in west Kent, three showed the hook-like extension quite obviously.

Furthermore, Hanson described the Giant Canada Goose as being the tamest of all the races. This would presumably have made it easier to catch and therefore likely to have been among the Canada

Geese brought to Britain. According to Delacour (1954), the Atlantic Canada Goose *B. c. canadensis* seems to have been the race imported into Europe, as Linnaeus's first reference was to F. Willughby's description in 1676 from specimens living in St. James's Park, London; G. L. L. de Buffon stated that it was breeding in large numbers in the park at Versailles, France. Whether, in fact, there were Giant Canada Geese among those importations cannot be proved, as we can find no evidence to show where the Canada Geese came from and the racial differences were not understood in those days. We feel, however, that there is now evidence to suggest that some Giant Canada Geese may well have been among those imported to Britain.

ACKNOWLEDGEMENTS

We are most grateful to Jim Ellwood and John Ruxton, who manage the W.A.G.B.I. Grey Lag Reserve in Cumberland, for drawing our attention to the hybrid and later for collecting it for us. We are also grateful to George Wallis, on whose land the second hybridisation occurred, and to Dr. Pamela Harrison who took the photographs.

SUMMARY

Two types of hybrid Canada Goose *Branta canadensis* × Grey Lag Goose *Anser anser* are described, resulting from two different families in which the direction of the cross was the same, i.e. male Grey Lag × female Canada Goose. One type of hybrid was strictly intermediate, with Canada Goose features dominant. The other bore a marked superficial resemblance to a blue-phase Lesser Snow Goose *Anser caerulescens caerulescens*. This could have given rise to an error in field identification.

It is suggested that the white head and neck of this hybrid may have been due to a recessive gene derived from the Giant Canada Goose *B. c. maxima*. Certain other characters are described in British Canada Geese in support of the possibility that Giant Canada Geese may have been included among the original importations into Britain.

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Notes

Heron eating House Sparrows.—Seton Gordon's recent note and the accompanying editorial comment on Herons *Ardea cinerea* eating birds (*Brit. Birds*, 59: 37) prompt me to record similar feeding behaviour by a captive Heron which came into my possession as a juvenile in December 1963. Although unable to fly, it is quite healthy and has the free run of my garden at Farcham, Hampshire.

On numerous occasions during 1964-66 this Heron has captured and eaten House Sparrows *Passer domesticus*, apparently juveniles in every case and many of them ones which have only just left the nest. The capture has always been accompanied by noisy mobbing from other sparrows in the vicinity, but this stops when the victim is either eaten or dead (in a few cases the corpses have been left uneaten) and at all other times the sparrows ignore the Heron completely. The prey is usually stalked slowly and then captured with a lightning stab as soon as it is within range, but occasionally when a sparrow is out in the open the Heron rushes at it and snatches it up before it realises the danger. The dead sparrows are always dipped in water before being swallowed.

These observations suggest that Herons may take birds more frequently than has been supposed, although it would be unwise to generalise from a captive individual. This Heron is otherwise fed on fish and it seems at least possible that the feathers from the sparrows may aid pellet formation. Other prey taken by it include Slow-worms *Anguis fragilis*, Common Lizards *Lacerta vipera*, House Mice *Mus musculus*, beetles, flies, moths, woodlice, earthworms and bread.

R. E. JONES

[The main points of interest here seem to be the methods of capture (especially the dashing at young birds in the open as an alternative to stalking them) and the negative reactions of the other House Sparrows to the Heron unless it actually has a live young sparrow. This contrasts with their behaviour towards such predators as Jays *Garrulus glandarius* and cats.—EDS.]

Swallows deserting traditional nest-sites when shelves erected below.—Every year until 1966, at Greensted Hall, Ongar, Essex, Swallows *Hirundo rustica* have caused a lot of trouble by trying to nest inside the house. In one room, used as a flower-room, they have always raised two broods on top of some pipes near the ceiling, coming and going through the open top of the window. As often as not, two pairs have nested on these pipes at the same time, and adults and young have always roosted there. When they tried building immediately inside the front door, however, on the ledge provided by the surrounding frame, we had to keep the door closed until they finally

resorted to the porch outside. Not wanting to have this bother again, I arranged for shelves to be put up under both nest-sites in 1966 and also just inside the garage doors, another favourite spot. The result was that none of the Swallows attempted to build wherever there was a shelf. Evidently these birds like a sheer drop below. It should be added that the hardboard and wood used for the shelves varied in width from $6\frac{1}{2}$ to $10\frac{1}{2}$ inches and that the plank 9 inches wide in the flower-room was painted white with the rest of the room.

MÁIRE TUGENDHAT

Water Pipits wintering on watercress beds.—In each winter since 1962/63 small numbers of Water Pipits *Anthus s. spinoletta* have been found in several similar habitats in an area of south-west Hertfordshire, on the borders of Buckinghamshire and Middlesex. The earliest record has been in November and the latest in April, but the highest totals have been during hard weather, with 13 the maximum on one day (twice). A summary of observations during the four winters from 1962/63 to 1965/66 follows in the hope that others will be encouraged to search suitable habitats at this season.

In 1962/63 I first identified a Water Pipit on a watercress bed near West Hyde, Hertfordshire, on 31st December, and H. G. Samways and I saw another there on 24th February. In 1963/64 B. P. Pickess and I found one on the same watercress bed on 21st December and what was presumably this individual was seen by many observers up to at least 12th February. In 1964/65 H.G.S. reported, and J. W. Donovan and I confirmed, that a Water Pipit was again present at this place on 26th December, and then on 28th December I found a second one on a watercress bed two miles to the north, at Springwell, Hertfordshire; the fact that two individuals were involved was confirmed by my returning quickly to the first site and by differences in the streaking beneath each bird's whitish throat. This discovery of a second individual led to a wider search of suitable areas, and more and more were found until on 7th February 1965 a total of 13 was present at five localities, all watercress beds. The numbers fell away during March and the last record was at Maple Cross sewage-works, Hertfordshire, on 10th April. In 1965/66 the first record was at the original watercress bed at West Hyde on 1st November; the numbers then rose until on 16th January, during another frozen period, 13 were again counted at five localities. On 28th January M. Coath found two near Chesham, Buckinghamshire, and on 12th February, after failing at the regular sites, Kenneth Williamson and I located a total of four at another series of watercress beds near Rickmansworth, Hertfordshire. The last record was on 4th April.

Nearly all these Water Pipits have been on watercress beds, both used and disused. On several occasions, however, one was seen feeding by

the River Colne and on four occasions one was observed at Maple Cross sewage-works, but the first locality is alongside a watercress bed and the second includes very similar marshy ground no more than a quarter of a mile from the nearest watercress. The birds thus seem to be closely linked with this specialised habitat. It may be significant that watercress beds never freeze, being fed by springs which remain at a relatively constant temperature during hard weather.

The Water Pipits are shy in comparison with the numerous Meadow Pipits *A. pratensis* in this habitat and only the exceptional individual allows an observer on foot within 50 yards. Some are very aggressive towards the Meadow Pipits, however, and chase them away when they get too close. On the ground, even while feeding, their stance is noticeably more upright than that of the Meadow Pipits and, when on the alert, recalls that of a Pied Wagtail *Motacilla alba*. They often perch on posts or remain concealed in trees. At a distance they are noticeably larger than the Meadow Pipits and show more contrast in tone between back and under-parts. When they fly they give a distinctive monosyllabic harsh call, to all intents and purposes indistinguishable from that of a Rock Pipit *A. s. petrosus*, and the outer tail-feathers appear to be pure white for the whole length. The flight is less erratic, stronger and more undulating than that of a Meadow Pipit and they tend to return in a wide circuit to a quieter part of the same watercress bed.

A photograph of one of the Hertfordshire Water Pipits is reproduced on plate 81a. This winter plumage (which may be compared with the breeding plumage illustrated on plate 81b) varies considerably. The whitish supercilium is always present, but may be very striking or sometimes rather inconspicuous. The relatively unstreaked head and back are typically grey-brown (with the head slightly greyer), but may occasionally be a warmer brown recalling the colour of a Song Thrush *Turdus philomelos*. The streaking on the breast is also rather variable, sometimes so strongly marked as to make an almost continuous ring. It generally becomes fainter towards the flanks and unmarked belly, however, while the throat is always unstreaked, the ground-colour of the whole under-parts is white or whitish contrasting with the rest of the plumage, and the primaries have pale edges. The legs are dark brown, sometimes with a reddish tinge, and the bill is slightly longer than that of a Meadow Pipit; the bill of one seen well was yellowish-horn on the lower mandible and dark brown on the upper.

In the early spring the head and back become greyer and the streaks on the under-parts fainter (though one on 4th April 1966 was still in typical winter plumage). One individual studied closely in late March had almost clear whitish throat and under-parts, only a few faint streaks remaining high on its breast which was also becoming suffused with pale pinkish-buff; its brownish rump and greyer back were un-

streaked, but there were some faint lateral streaks of dark grey on the top of its head. Another was in full summer plumage on 27th March 1966, looking very striking and more brightly coloured than text-book illustrations, with head and shoulders blue-grey, rump and primaries grey-brown and under-parts wholly suffused with pinkish-buff except for a white line between breast and wing; in general, this bird appeared very wagtail-like.

I. G. JOHNSON

[A request for information on wintering Water Pipits appears on page 559.—EDS.]

Starling sucking House Sparrow's eggs.—Early in August 1966 I was sitting in my second-floor flat at Lewes, Sussex, when my attention was attracted by the persistent alarm calls of a male House Sparrow *Passer domesticus* on the roof of a house across the road. This roof is at the same level as my window and so I had a good view of what subsequently happened.

A Starling *Sturnis vulgaris* was standing in the roof gutter with its head under the overhanging slates and, to my astonishment, brought out a small, light-coloured egg in its beak. It flew with this up to the chimney stack on top of the roof and stood on the flat surface at the base of the chimney pots. I could not see clearly at that distance whether it then held the egg in its feet, but it put its head down and evidently ate the contents, for when it had finished the wind caught what was obviously by now an empty shell and blew it down the roof. The Starling then repeated the operation exactly, returning to the same place in the gutter, bringing out a second egg in its beak and flying back to the identical spot on the chimney stack to suck the egg until the empty shell rolled down the roof like the first one, after which it flew away.

The male House Sparrow, which I took to be the owner of the nest, continued to call loudly while all this was going on and hopped up and down the roof just above the site. There were three female sparrows higher up the roof, but they did not seem unduly perturbed.

H. ELIZABETH JEANS

Review

The Feathers and Plumage of Birds. By A. A. Voitkevich. Sidgwick & Jackson, London, 1966. xvi+335 pages; 74 text-figures and 21 tables. 45s.

One of the 'Biology Series Monographs', this book is unfortunate in its title which suggests a wide and generalised study of bird feathers and plumage. It is, in fact, a translation from the Russian of what appears to have been a scientific paper on the role of the glands and

their secretions in the formation and moulting of feathers. The date of original publication is not given, but the 50-page bibliography contains no references later than 1960. The first 56 pages of the book partly justify the title in that they summarise what is known of the structure and development of the feather; but, in keeping with the nature of the work, the feather is considered as a specialised epidermal structure rather than as the main external feature of a diversity of birds.

Most of the book is devoted to the evidence concerning the part played by the glands and hormones in controlling feather growth and replacement. The author's extensive experimental work is described, together with that of others, and the results are discussed, a final section being devoted to the conclusions. The experiments seem to have consisted mainly of the removal of glands and the injection of hormones, at various stages and in various combinations, together with the plucking of patches of feathers to study regrowth.

The evidence suggests that the thyroid gland and its hormones control the growth and pigmentation of the feathers, as well as their moult. The external controlling factor appears to be light intensity and duration acting via the anterior lobe of the pituitary to stimulate the thyroid gland. In contradistinction to some published views, Dr. Voitkevich is of the opinion that the thyroid hormones have the primary function in controlling moult and that any effect of the gonadal secretions is secondary. Periods of stable plumage between moults are explained in terms of temporary exhaustion of the hormones in the body, which need time to build up again to the necessary level; and moult after gland removal is said to be due to a sufficiency of hormones having been produced beforehand. More evidence regarding species with atypical moult would have been useful here. Thyroid hormone levels appear to govern intensity of melanin pigmentation and it is suggested that differences in illumination could produce geographical variation in melanism, an interesting point in view of the use of slight variations in melanin colour to determine subspecies assumed to be genetically different.

The translation is fairly good, but has led to some rather contorted English in a book which is at no point easy to read. There is evidence of a lack of ornithological knowledge producing errors of terminology. For example, a section on the first down plumage is entitled 'the primary feather', retrices become 'helm feathers', and the Ptarmigan appears as the White Partridge.

This work is mainly for the specialist, and is a valuable contribution to our knowledge of the factors controlling plumage production. There are extensive references to both Russian and Western literature, and the translated Russian titles give some idea of the extent to which the language barriers hinder the exchange of ideas.

C. J. O. HARRISON

Letter

Week-end bias, length of stay of rarities and proportion of rarities undetected

Sirs,—Although the effect of 'week-end bias' (the increased watching at week-ends) is often commented on, there appear to be no figures to show exactly how marked it is. In an attempt to determine this, I have analysed the annual 'Reports on rare birds . . .' for the eight years 1958-65 (*Brit. Birds*, 53: 153-173, 409-431; 54: 173-200; 55: 562-584; 56: 393-409; 57: 261-281; 58: 353-372; and 59: 280-305). Fig. 1 shows the daily distribution of the dates on which rarities were first seen. It demonstrates the disproportionate number found at week-ends (45%), with most being discovered on Sundays (26%). The pattern was similar in each of the individual years.

In view of this enormous bias, it is clearly important that unless all records come from a site or sites covered daily, such as observatories, analyses should be by periods of seven or 14 days, and not of five or ten days as is often the practice at present.

The records of the Aquatic Warbler *Acrocephalus paludicola* analysed in the 1965 report (*Brit. Birds*, 59: 294) are a good example of the effect of week-end bias when ten-day periods are used. The comment under this species reads: 'These records bring the total since 1958 to over

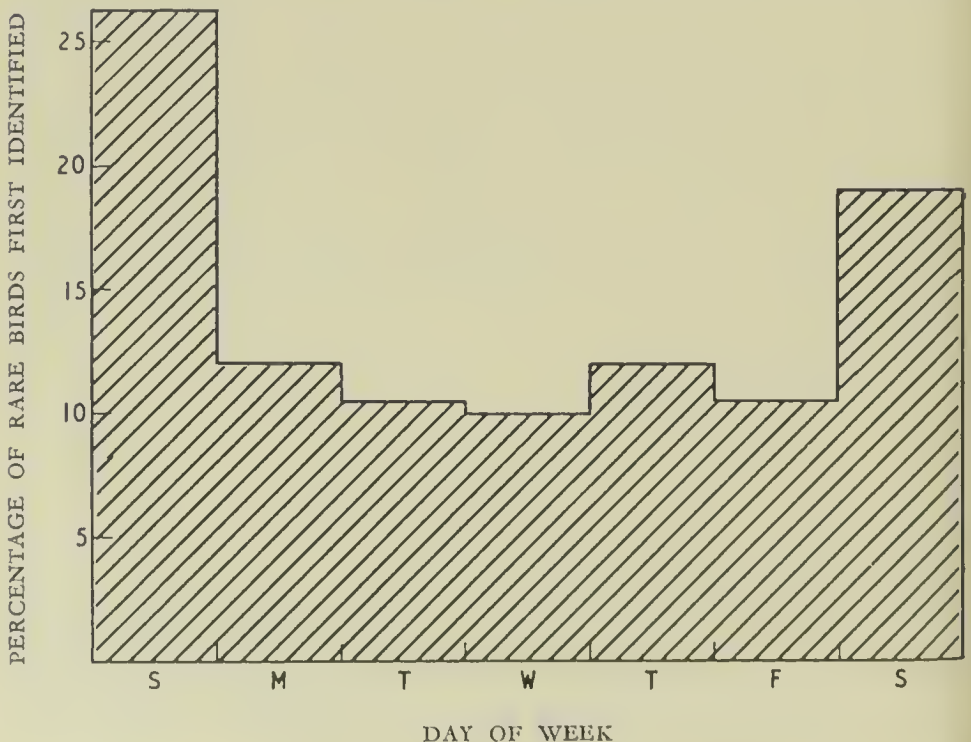


FIG. 1. Daily distribution of first sightings of rare birds in Britain during 1958-65

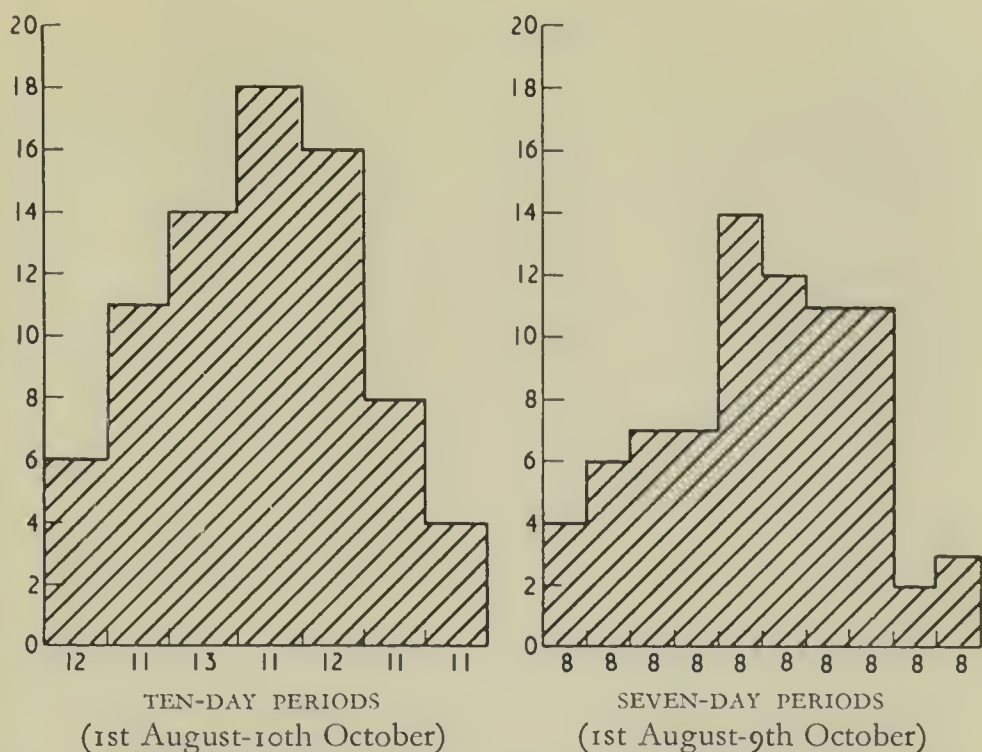


FIG. 2. Distribution by ten-day and seven-day periods of the 77 records of Aquatic Warblers *Acrocephalus paludicola* in Britain and Ireland during August-October 1958-65. The number of week-ends in each period is shown at the base of each column

eighty.* Analysis shows that, apart from single occurrences in May and November, all have been between early August and early October. If these seven* weeks are broken down into ten-day periods, the resulting groups of records total 6, 11, 14, 20*, 16, 8 and 4. This is a remarkably smooth curve of occurrence and it can be argued that this east European and west Asiatic summer visitor has proved itself to be a regular autumn migrant here.' Of the seven 'ten-day periods' analysed, however, one is an eleven-day period (21st-31st August) which contained 13 full week-ends in 1958-65; while, of the other six, two contained twelve full week-ends and four contained eleven full week-ends. The effect in this particular case was to produce a much smoother curve than there should be. Histograms for the Aquatic Warbler records in these ten weeks, analysed by ten-day and seven-day periods, are shown in fig. 2 and illustrate this clearly.

The records of all the rarities were also analysed to determine length of stay (fig. 3). It is notable that as many as 56% were seen only on the day of their discovery and also that as many as 11% stayed over a fortnight.

*These figures are incorrect and should read 79, ten and 18 respectively. These minor numerical errors do not affect the argument, however, and the corrected figures are used in fig. 2.

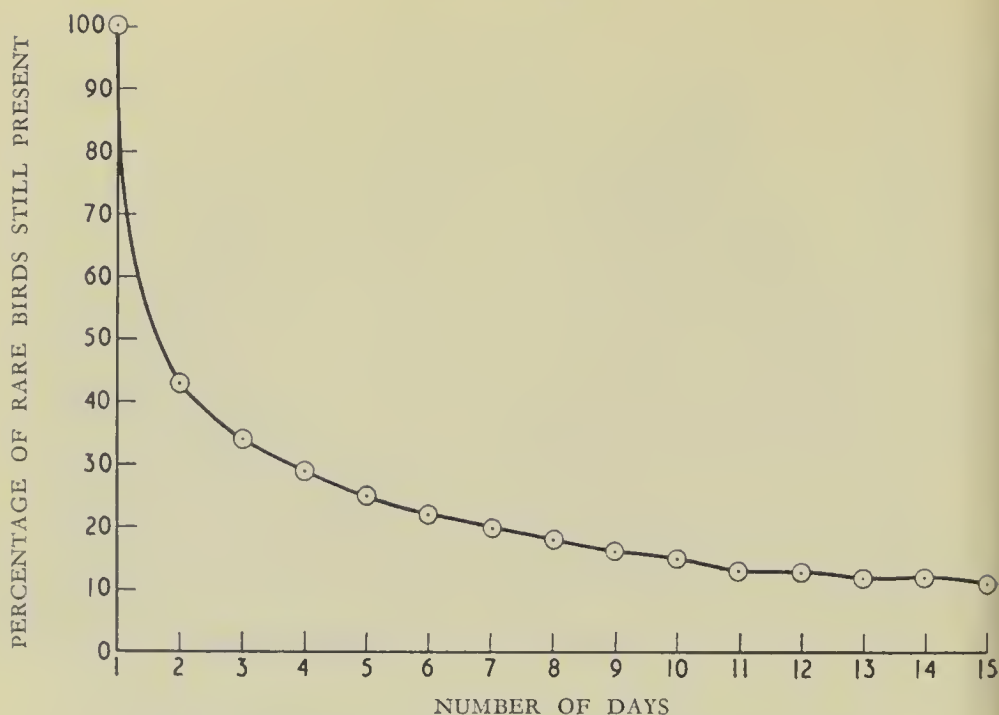


FIG. 3. Length of stay of rare birds in Britain during 1958-65

There is often speculation regarding the proportion of rare birds occurring in Britain which are never detected. This will probably always remain a matter for guesswork, but, from the above analyses, it is possible to calculate the additional number which would have been seen if coverage had been as comprehensive every day as on Sundays. The number of rarities seen on Sundays obviously does not represent only the birds newly arrived on Sundays; it also includes those arriving earlier but not being seen until a Sunday (for instance, birds arriving on a Monday, staying at least seven days and not being detected in the interim; birds arriving on a Tuesday, staying at least six days and not being detected in the interim; . . . and so on; also a smaller number arriving on a Monday, staying at least fourteen days and not being detected in the interim; . . . and so on). Application of the curve shown in fig. 3 to the number of rarities seen on a Sunday (*including* those discovered previously) indicates that as many as 32% of the birds first seen on a Sunday were not, in fact, newly arrived.

Adjustment of the figures by this technique suggests that the number of rarities seen represented only 84% of that which would have been recorded if coverage had always been as complete as on Sundays; or, putting it another way, the number of rarities seen would have been increased by nearly a fifth (19%) if there had been daily 'Sunday coverage'. Although this figure is high, it is less than a quarter of that which uncritical consideration of the week-end bias shown in fig. 1 would suggest.

J. T. R. SHARROCK

Requests for information

Status of Water Pipits in winter.—The discovery that Water Pipits *Anthus s. spinoletta* are now wintering regularly, perhaps in some numbers, on watercress beds in southern England (see pages 552-554 and plate 81a) has encouraged the British Trust for Ornithology to give support to an investigation into the status of this bird during the 1966/67 winter. Already there have been reports from Beddington sewage-farm in Surrey, the marshes of the River Test in Hampshire and Chew Valley Lake in Somerset; at least four are on the original watercress beds in south-west Hertfordshire. The enquiry is being organised by **I. G. Johnson, 124 Sharps Lane, Ruislip, Middlesex**, who will be glad to send questionnaires to any interested observers able to watch for this subspecies at watercress beds, sewage-farms, reservoirs, freshwater marshes on the coast, and other likely haunts. Apart from the field characters summarised by Mr. Johnson on pages 553-554, the problem of identification was covered by Kenneth Williamson in his paper on 'Moult and its relation to taxonomy in Rock and Water Pipits' (*Brit. Birds*, 58: 493-504).

Feeding grounds of Eiders in England.—The post-war spread of the Eider *Somateria mollissima* in Great Britain was described by J. H. Taverner in two papers in 1959 and 1963 (*Brit. Birds*, 52: 245-258; 56: 273-285). This spread seems to have received a setback in the winters of 1963/64 and 1964/65, however, which may possibly have been due to the Eiders' feeding grounds being damaged by the cold weather in early 1963. Any information on changes in populations of shore crabs *Carcinus maenas* or mussels *Mytilus edulis* since the cold winter of 1962/63 would be welcomed by **J. H. Taverner, 13 Stockers Avenue, Winchester, Hampshire**.

Birds of Tripolitania.—Graham Bundy and J. H. Morgan are working on the birds of the Tripolitanian region of Libya. Anyone who has unpublished records or other relevant data concerning this area is requested to contact **Graham Bundy, c/o Supply Wing, 32 M.U., R.A.F. St. Athan, Glamorgan**. This is a relatively little known region ornithologically and it is hoped to prepare papers on migration in addition to a check-list. Notes on species seen, numbers if possible, localities, dates, and any relevant comments would be most useful.

News and comment

Edited by J. L. F. Parslow

The B.O.U. 'Check-List' and 1966 records of rare birds.—The Records Committee of the British Ornithologists' Union hopes to complete the text of the new edition of its standard 'Check-List' by the end of March 1967. This publication will review more fully the status and distribution of British and Irish birds than did the 1952 List. It will appear under a rather different title which will take into account the greater scope of its contents. Published records up to the end of 1965 are all to be incorporated, but it is hoped that, with the co-operation of the Rarities Committee of *British Birds* and the editor of the *Irish Bird Report*, it will also

be possible to include, before publication, those records of extreme rarities in Britain and Ireland in 1966 which significantly alter or add to the status summaries compiled purely on published information. In order that the List shall be as complete and up-to-date as possible, special consideration will be given to species recorded for the first time in 1966. Observers who have not yet sent in details of 1966 rarities to either the secretary of the Rarities Committee (F. R. Smith, Telford, Hill Barton Road, Exeter, Devon) or the editor of the *Irish Bird Report* (Major R. F. Rutledge, Moorefield, Ballybrack, Co. Dublin) are asked to do so as soon as possible. The records most urgently needed are those of species which have been recorded on fewer than about 20 occasions in Britain and Ireland.

Hoverport threat at Pegwell Bay.—A number of naturalist organisations, including the Nature Conservancy, the Royal Society for the Protection of Birds, and local societies, are opposing a proposal to construct a hoverport at Pegwell Bay, Kent. A local public enquiry is to be held by the Minister of Housing and Local Government. The area is scheduled as a Site of Special Scientific Interest and is of particular importance for its resident wintering population of about 10,000 birds, especially waders and wildfowl. According to the Council for Nature, the extensive estuarine mudflats provide naturalists in a variety of fields with 'opportunities for study which cannot be had at the same level for 50 or 100 miles around'. In a recent survey of the coastline, the Kent County Council indicated a policy of protecting those parts of scientific or high amenity value, and it is hoped that this policy will be upheld when the application for a hoverport is considered.

R.A.F. Ornithological Society's busy first year.—The Royal Air Force Ornithological Society, which was founded in October 1965 (*Brit. Birds*, 58: 526), has had a successful and busy first year according to a report by its chairman, Wing-Commander A. A. J. Hudson. Among the many activities in which its members have participated, both at home and abroad, was the society's first full-scale expedition. This took place in September when four members visited Cyprus with the aim of ringing broods of Eleonora's Falcons, an objective that was successfully accomplished with the assistance of a Cyprus-based R.A.F. Mountain Rescue Team. Expeditions to far off places may well become quite a feature of this ambitious society's activities. During 1967 it plans to organise or to participate in expeditions to the Solomon Islands, the Seychelles and Ellesmere Island, as well as mounting others nearer home. In Britain, members are surveying the bird populations of airfields, in connection with the problem of the bird-strike hazard to aircraft. The first numbers of two publications—a 'Journal' and a 'Newsletter'—have already appeared. Regular issues of both will follow and these will be vital for keeping members in touch with each other's activities, for although membership still totals only about 80 it is scattered over a wide area of the globe. Past as well as present members of the R.A.F. are entitled to join the society.

Minor set-back for Lord Hurcomb's Protection of Birds Bill.—A clause which would have removed the Home Secretary's powers to prescribe common birds whose eggs may lawfully be taken was successfully opposed in the House of Lords on 31st October during the committee stage of the Protection of Birds Bill sponsored by Lord Hurcomb. Introducing an amendment, the Earl of Cranbrook said that he thought that the collecting of eggs by boys led them to a study of nature, and that there was no evidence that 'birds-nesting' had any effect on bird populations. Lord Hurcomb argued that the encouragement of egg-collecting was the reverse of the modern trend in education and conservation, and that children should be persuaded to respect nature rather than abuse it. Lord Cranbrook's amendment was passed narrowly by 42 votes to 37.

Natural History Books *autumn publications*

PUBLISHED RECENTLY

- The Original Bird Paintings of John James Audubon. 2 vols.
boxed. 25 gns.
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